Kaori Mochinaga

KINTSUGI

THE WABI SABI ART OF JAPANESE CERAMIC REPAIR

TUTTLE

Kintsugi: The Wabi Sabi Art of Japanese Ceramic Repair shares traditional methods you can practice in your own home. Step-by-step lessons in repairs suited to every level of experiences—filling cracks to completely rebuilding and finishing a broken piece—fill the pages of this in-depth yet unintimidating guide.

With some urushi lacquer and metallic powder, your broken piece becomes whole again, more beautiful and meaningful than ever before. Assemble your tools, set up your workspace, and let this book help you master the mindful art of kintsugi.

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NOTE: This book introduces many Japanese terms pertaining to the tools, materials and processes involved in the art of kintsugi. We strongly encourage you to read through Lesson 13 to familiarize yourself with the basics before embarking on any of the projects in this book.

Why I Wrote This Book

My work is propelled by my fascination with "urushi"—the lacquer used for kintsugi. For me, kintsugi is not merely a practical process of repairing broken pottery, adding some gold paint and calling it good. When an item breaks, we realize how precious it is to us, and a bloom of compassion unfurls for the one who accidentally causes the break. The various episodes surrounding the damage are engraved within the repairs—these alchemical elements add depth and beauty to the mended piece, perhaps even more depth and beauty than it had in its unmarred, pristine state.

I believe this is the true appeal of kintsugi. Urushi has been around since ancient times, and the more we know about it, the more surprising and delightful its beauty and versatility. The use of urushi to repair pottery and ceramics is a time-consuming process that may feel daunting at first.

However, it is precisely because the current world is so fast-paced that this deliberate slowing down with detailed consideration of the seasons, temperatures, and humidity is a rich and rewarding experience. What an honor it would be for me if you, too, could feel the ineffable stirring that comes from using the art of kintsugi with your very own hands to breathe life back into a beloved, broken item.

"Mono Tsugi" — Kaori Mochinaga

Lesson 01

The Appeal of Kintsugi (Part 1)

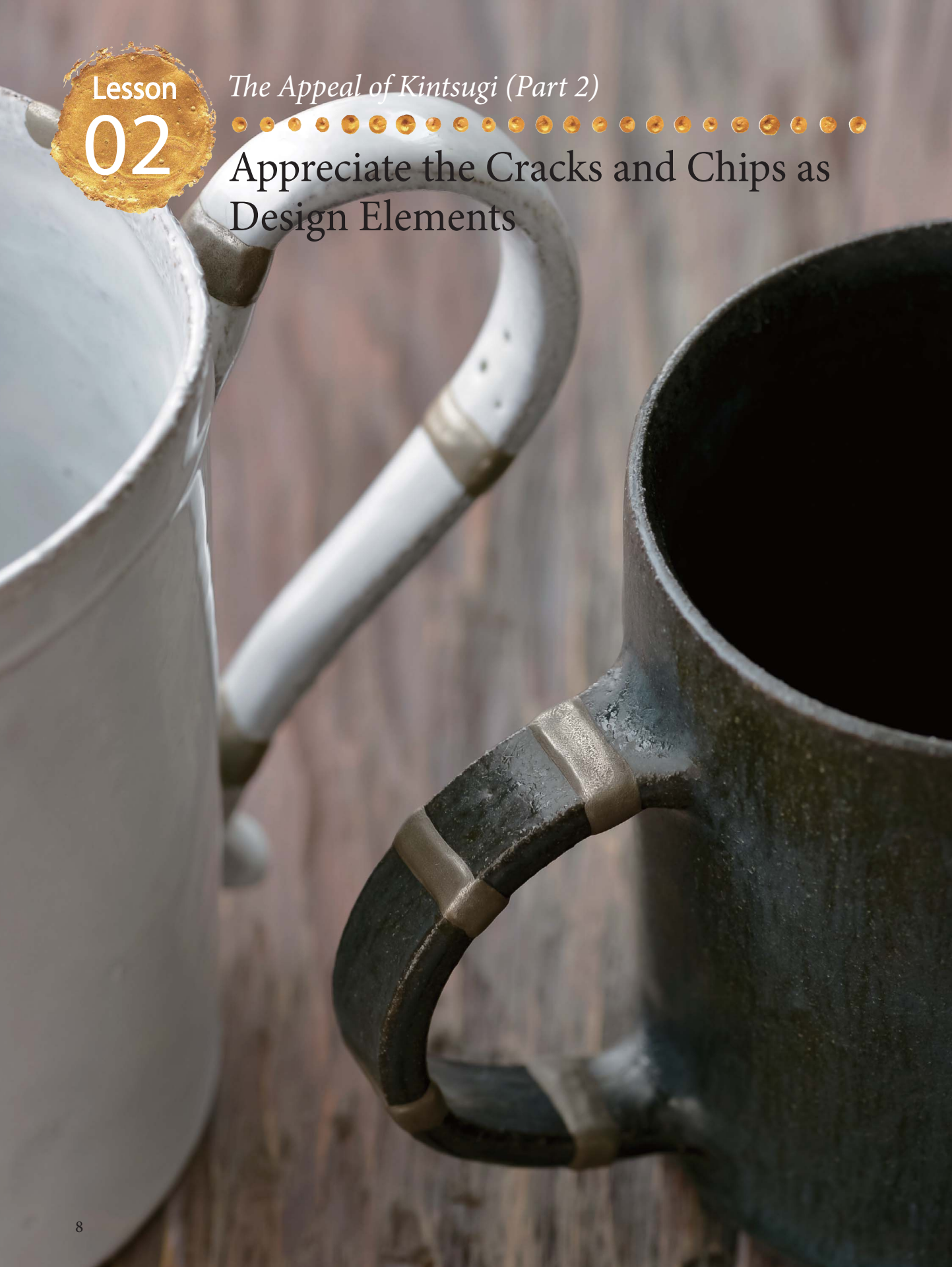
Urushi is Food Safe

Considered a “natural glue,” you can feel safe about using non-toxic urushi to repair tableware. Seeing the lovingly mended plates, bowls and cups on your dining table will make your every meal extra special.

Lesson 02

The Appeal of Kintsugi (Part 2)

Appreciate the Cracks and Chips as Design Elements



Even if your favorite cup breaks, kintsugi will give it a new makeover. Instead of lamenting the breakage, let's embrace and love the opportunity to create something new and beautiful through mending.

PART 1

Get to Know the Tools and Materials for Kintsugi

Lesson 03

Determining the Mending Technique(s)

Choose the Repair Technique that Works Best for Your Item

The item in need of restoration may have sustained different kinds of damage such as dings, cracks, chips, fissures, etc. and each will require a different method of mending. It's important to carefully assess the damage, then determine the appropriate method. This section will feature the common types of damage and refers to pages with applicable mending techniques. Please use this section along with the "Mending Preparations" segment on pages 14-15.

Small Chips

Frequently found along the rim of a vessel. More often than not, the broken piece is no longer available, so the indentation will need to be filled.

→ PART 2 page 31

If the broken piece is available, glue the piece back on first, then fill any remaining chipped areas.

→ PART 2 page 51

Cracks

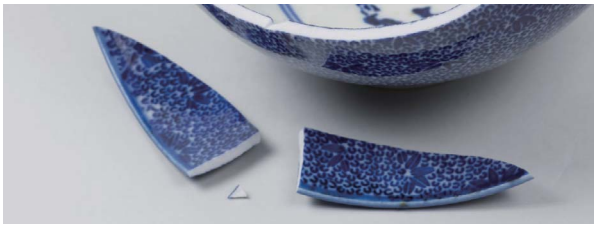
An example of a hairline crack or fissure. At first glance, it's often difficult to know the actual depth and length of the crack, and a way to determine the extent of the damage is by pouring raw lacquer (ki-urushi) into the cracked area. If the lacquer doesn't seep through, the crack is shallow enough to be repaired with the rice "togi-jiru" method.

→ PART 3 page 59

Fragments

When the vessel has broken apart into fragmented pieces. The fragments will be glued together with urushi. This method is ideal when the fragments fit together perfectly without any chips.

➔ PART 4 page 69



When the breakage results in chips and fissures in addition to fragments.

➔ PART 4 page 75

Large Chips • Broken Handles

When larger chunks of the vessel have broken off, typically along the top rim. The chipped piece is no longer available; therefore, urushi putty will need to fill the space. This type of repair is considered the most challenging.

➔ PART 5 page 93

Due to the repeated stress load, typically slender handles will break off easily. Extra reinforcements will be added as part of the mending process.

➔ PART 5 page 101

Complex Repairs

When there are many fragments in various sizes. Prior to gluing, the pieces will need to be pre-assembled to determine the assembly order.

➔ PART 5 page 117

Lesson 04

Mending Preparations

How to Clean and Prepare the Surface Before Repairing the Item

When the vessel is broken but clean	No need to wash Sterilize with alcohol		
When the vessel is broken and there is food remains, dirt or dust	Taking care not to cut yourself, scrape off the food and gently wash with dish detergent	Dry	
Tea stains – **A little**	Wipe with a damp melamine sponge and allow to dry for a full day	Disinfect the area with benzene or ethanol	
Tea stains – **A lot**	Immerse in fresh water for 10 minutes, then soak in diluted bleach to clean	Immerse in fresh water, then gently wash	Dry
When the vessel is broken and has embedded oil stains and dirt	Wrap vessel in a white cloth, immerse in a pot of water and bring to a slow boil.	Boil for about 30 minutes and turn off heat. Let cool.	Gently wash with dish detergent and air dry for about one week.

Additional considerations for vessels made with softer clay or when there are cracks and fissures.

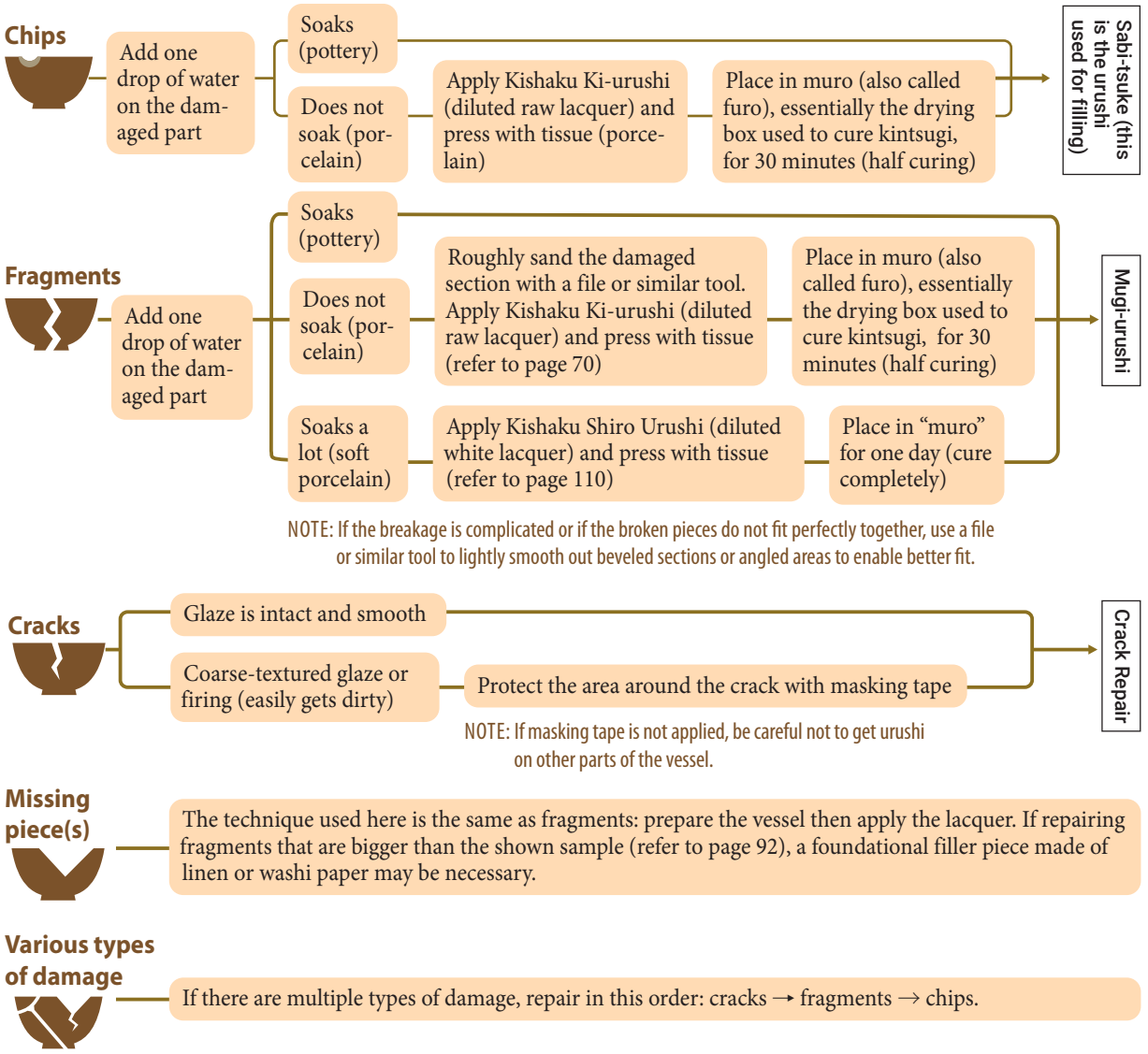
Clean and prepare the vessels before embarking on repairs. The most important factor in mending is whether the urushi (lacquer) will soak in and stick. The variety of source materials such as pottery, porcelain, earthenware and stoneware as well as the mix of glazes may seem overwhelming when determining the mending method, but regardless of the type of vessel, you can do a preliminary test of how absorbent the material is with a single drop of water.

Cleaning Tips

- The urushi will not adequately harden if there is oil residue, dust or moisture on the vessel. This will also weaken the repairs. Use the appropriate cleaning methods before proceeding to mending techniques.
- Wipe off any moisture after washing the vessel and air dry in a well-ventilated area. Air dry porcelain for two to three days and pottery for at least one week.

※ Old vessels with aged, ingrained dirt may add vintage charm and character so you may want to avoid cleaning every part of the vessel. Just make sure that the areas to be repaired are free of debris and oily residues.

※ When removing synthetic adhesives, utilize solvents specifically designed for the adhesive. Alternatively, immerse the vessel in boiling water to loosen the adhesive and scrape off any remaining adhesive with a blade or hera.



For absolute beginners, the preparatory urushi step is not necessary. However, for the more seasoned kintsugi practitioner, the preparatory urushi step may be incorporated to increase the longevity of the repair.

Surface Preparation Tips

- When the damaged area has a rough texture, urushi will adhere well so preparing the surface may not be necessary.
- Conversely, if the damaged area is smooth, the urushi will not adhere effectively so make sure to prepare by filing/sanding.
- If the damaged area is crumbling due to the softness of the material, preparation is necessary to avoid the excessive absorption of urushi, which will weaken the repairs.

Lesson 05

Basic Tools • Materials

Choose the Tools and Materials for Mending

The 3 basic types of urushi to have on hand

Kintsugi has two main processes:
1. Repair broken vessels with urushi
2. Apply gold powder along repaired seams

This section will list the essential tools and materials for the first process.

You will want to prepare three kinds of urushi: ki-urushi (raw lacquer), kuroroiro-urushi (black urushi), eurushu (picture urushi). The addition of glass-specific urushi and white urushi will further expand your mending repertoire, but the three kinds will suffice. Gauge your skill level and add other types of urushi as needed.

Basic Tools for Mending

① Glass sheet	Use like a palette for various types of urushi. Smooth surfaces like tiles could work as well.
② Hera	In general, a hera is a spatula-like took that can be used for mixing, applying and scraping urushi. We use it to knead flour or tonoko (abrasive powder). Use a plastic model with some flexibility.
③ Knives and blades	Use to shave or scrape the base urushi. When scraping the interior of a vessel, use a knife with a rounded tip such as a palette knife, scalpel or craft knife.
④ Brush	Use to apply kurororiro-urushi (black lacquer) and e-urushi (art urushi that is reddish in hue). A thin round brush and a small flat brush are useful.
⑤ Thin hera varieties	Use for filling chips and applying mugi-urushi. Bamboo and metal types are available.
⑥ Cotton swab	Use for wiping excess urushi or to prepare the urushi filling. Try to find the small swabs meant for babies.
⑦ Holder for brushes and heras	Use as a resting place for brushes and heras in between steps.
⑧ Wipes	Paper wipes. Use to soak with benzene for cleaning.
⑨ Plastic wrap	To preserve freshly made urushi. Also use to form the filler shapes when repairing chips and fragments. Find kitchen wraps made of thicker plastic.
⑩ Benzene	Use to clean vessels and tools. May substitute anhydrous ethanol.
⑪ Cooking oil	Use to cleanse brushes or to remove urushi if it gets on skin.
⑫ Kerosene	Use to dilute urushi (1:1 ratio). Utilize a small bottle with a dropper to dispense one drop at a time. Turpentine works as well.
⑬ Water dispenser	Use to make the base urushi. A spout bottle is handy.
⑭ Scissors	Use to cut sandpaper or hemp thread.
⑮ Tweezers	Use for small shards and fragments.
⑯ Sandpaper	Use when sanding the urushi filling. 600 grit and 800 grit are handy.
⑰ Microfinishing film	Use to polish the base coat glass-specific urushi and nakanuri.
⑱ Diamond drill bit	Use to prepare surfaces or to add scratches.
⑲ Tokusa (horsetail plant scouring brush) • Charcoal	Use to sand the edges of urushi filling. Tokusa is used exclusively in this book.
⑳ Masking tape	Use to temporarily secure fragments or to protect delicate surfaces from urushi.
㉑ Rubber gloves	If you are a sensitive to urushi, always wear gloves.

Basic Materials for Mending

㉒ Ki-urushi	Filtered raw lacquer from the urushi tree sap. A very important part of all kintsugi projects.
㉓ Kurororiro-urushi	Use for the base coat glass-specific urushi and nakanuri (middle layer). The black color is achieved by combining ki-urushi with oxidized iron.
㉔ Bengaraurushi (e-urushi)	Use before applying gold powder. The reddish-brown color results from adding bengara pigment into ki-urushi.
㉕ Glass-specific urushi	Combining kurororiro-urushi and e-urushi with a 1:1 ratio forms a lacquer that adheres better on glazed surfaces. This book uses the kijiro brand.
㉖ Tonoko	Use to create urushi filling for chipped areas. Made of fine whetstone powder.
㉗ Djinoko	Blend into urushi to fill deep and/or large chips. Made of steamed and powdered Diatoma ceous earth.
㉘ Flour	Use to make the mugi-urushi glue.

Lesson 06

Basic Tools • Materials

Get to Know Basic Tools and Materials

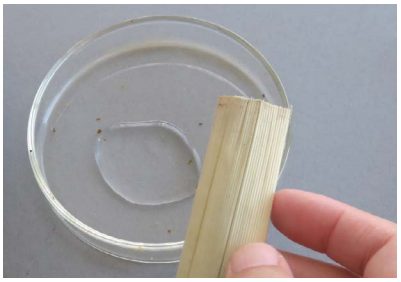
Prepare the muro (lacquer curing bath)

Urushi hardens in a humidity level of 70-85% and over 78°F/20°C temperature, so it is necessary to place it in a box (room) in which the temperature and humidity can be controlled. Insert a thermo-hygrometer and a container of water or dampened cloth in a lidded wooden or plastic box to create an optimal environment for curing the urushi.

Wear gloves

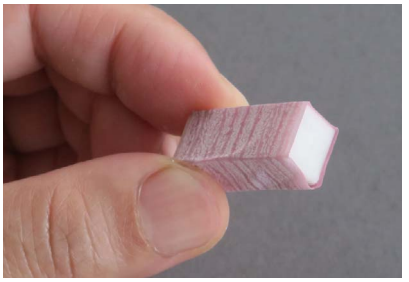
Beginners should always wear rubber gloves when handling urushi. Don't forget to cover work surfaces with newspaper sheets or other protective materials.

Sand with tokusa (horsetail plant)



Once the chip has been filled with urushi and roughly scraped with a knife, immerse the tokusa in water and use it to sand down the surface. Tokusa will not scratch the glaze. Dried tokusa stems can be found online. You may want to split the tokusa open and attach a gum tape backing to make it easier to use, but tokusa can be used as is.

Polish with microfinishing film



The film has adhesive on one side. Cut into small pieces, peel the paper backing and stick to an eraser or fingertip to use. An ideal way to polish the urushi surface.

Strain urushi

Due to the natural impurities in the urushi, using it directly from the tube will result in uneven textures. To prevent this, make sure to strain the lacquer especially for the final paint layer, just before sprinkling the gold powder.

Cut two small pieces of miyoshino paper (a porous paper), layer them and place a dollop of urushi on top. Twist the paper pieces to strain the urushi.

If you strain the urushi onto a piece of plastic wrap, storing the urushi will be easier later.

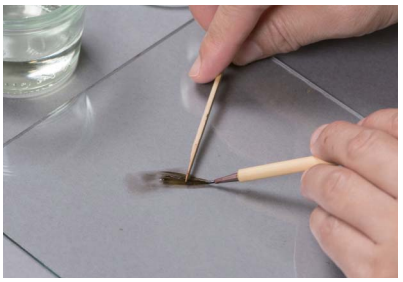
Lesson 07

Tool Maintenance

Caring for Your Tools

Wash the paintbrush used for applying urushi

Wipe as much of the urushi off of the paintbrush with tissue, then soak the brush tip in cooking oil.



Use a flexible hera to scrub the brush hairs to remove more of the urushi. Gently press the hera, starting at the base of the brush hairs.

Wipe off urushi with tissue. Repeat this removal process 3 to 4 times to eliminate as much urushi as possible. Finally, reshape the brush tip and store.

Use brushes that have been cleaned with cooking oil

To use the oil-cleaned brush, soak the brush in benzene first to remove the oil. Ethanol disinfectant or turpentine may be used as well. If oil remains on the brush hairs, the painted urushi will not dry.

Carefully clean with a wipe or tissue, making sure to avoid dust. The brush is now ready for use.

Cleaning the hera and glass sheet

Before you begin and in between processes, always clean the hera and glass sheet with benzene.

Use another hera to scrape off any urushi off of the hera and wipe off with a tissue. Consider using small rags for wiping purposes.

Clean the glass sheet with benzene-infused tissue.

Lesson 08

Finishing Tools • Materials

Prepare the Finishing Tools for Gold and Silver Powder

Place the marufun (gold powder with larger, rounded particles) in a fundzutsu (bamboo tube with a net made out of silk or gauze) first. Use mawata (silk blend wadding) to apply keshifun (gold powder with fine, smaller particles).

Once the vessel is repaired, it's time to proceed with the decorative finish using the"Maki-e" method (a painting technique developed in the Heian period [794-1195 CE]). Maki-e involves sprinkling gold or silver powder for decorative effect as well as painting with colored urushi. The gold powder eventually became synonymous with the quintessential kintsugi finish.

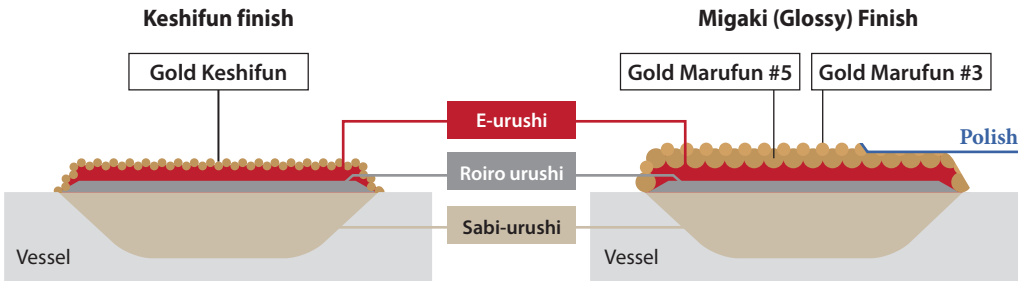
Gold powder has a vivacious luster and beauty unique to the metal. Silver powder evokes a calmer, cooler impression. Each type of powder comes in marufun and keshifun form; use a fundzutsu for marufun powders and mawata for keshifun. A dusting brush called harai kebo will be necessary for both types of powder.

Finishing Tools

① Harai kebo	Use to sweep loose gold and silver powder after application.
② Taiki	Use to polish the marufun particles to create a glossy finish.
③ Fundzutsu	A bamboo tube used for sprinkling marufun. The gauze or silk net at the tip acts as a sieve for the powder. We used one with a 150 (medium-coarse) mesh.
④ Funsaji	Use to fill the fundzutsu with marufun. A thin round brush and a small flat brush are useful.
⑤ Menou	Agate burnisher used to polish the hardened marufun. A substitute for the traditional tool called "taiki" which was originally made out of fish teeth.
⑥ Funchin	Use as weights to hold down the powder wrapping. Small, smooth stones would work as well.
⑦ Mawata	Use to sprinkle keshifun. Translates to "silk wadding" but it is actually made out of a silk blend material.
⑧ Miyoshino paper (Straining paper)	Use to strain the impurities out of the urushi that will be used for the finishing process.
⑨ Microfinishing film	Once the marufun has been sprinkled and the urushi has cured, use the microfinishing film to lightly sand the surface (Buflex Green brand).

Finishing Materials

⑩ Marufun (Gold powder • Silver powder)	Powder that will be polished to a glossy finish. To create the powder, a file is used to shave gold nuggets, then the filings are crushed into rounded particles. The powder comes in various sizes starting with #1, and this book uses sizes #3 and #5. The smaller the number, the finer the powder.
⑪ Keshifun (Gold powder • Silver powder)	The smaller keshifun particles, which are formed from crushed gold and silver leaf, create a more matte finish. Since the finer particles will stick to the fundzutsu, mawata is used for sprinkling keshifun.
⑫ Amor (Kiku-Amol a is similar product)	Use as an additional polishing step after the agate burnisher/taiki. Made of an abrasive alumina compound diluted with oil. Scoop a small amount onto a cloth and polish the gold or silver powder. A smaller tin size is available as well.
⑬ Roirio migakiko	To use this polishing powder, apply a thin layer of oil on the desired surface with a cotton swab, then take a small amount of the roiro migakiko onto your fingertip and polish the surface. Follow up by wiping the area with a tissue to create a shiny finish.



The goal with keshifun is to create a thin golden layer. It has a more muted and matte glow. It's an easier powder for beginners to handle. Conversely, the textured and thicker layer of marufun is trickier to maneuver.

The gold is hardened with the urushi and polished to a high shine. Blending the #3 gold powder into the #5 powder yields a denser gold layer. Start by practicing with a small chipped area.

Lesson 09

Finishing Tools • Materials

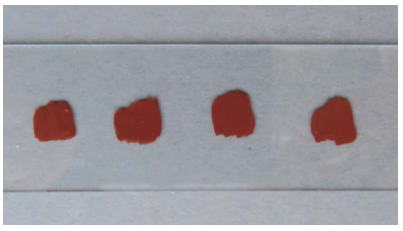
Learn to Use Gold Powder to Create Beautiful Finishes

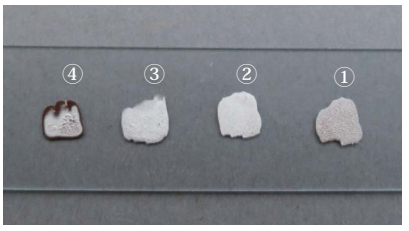
Sprinkle gold marufun with the fundzutsu tube (the process is the same for silver marufun)

Pour gold powder into the fundzutsu with the funsaji.

With your index finger, gently tap the fundzutsu until the powder settles into the gauze end, then use your middle finger to sprinkle the powder over the repaired area. Once the #5 powder has been sprinkled, sweep the area with the harai kebo to collect the loose powder. Next, embed #3 powder on top of the #5 powder with the harai kebo.

Gauge the best time to sprinkle the gold powder





It's important to gauge the best timing to sprinkle the precious metal powder. The optimal condition for powder adhesion will vary depending on the state of the urushi and seasonal weather. It's a good idea to use a test piece before sprinkling the powder on the repaired vessel. During summer, test the powder in 10 minute intervals and in the winter, try 20 minute intervals for testing. (Since gold powder is more expensive, conduct testing with silver powder.)

① The powder has been applied too soon and is sinking into the surface, blurring the urushi. ② ~ ③ The timing of sprinkling the powder is just right. ④ The urushi has already started to cure and it is too late to sprinkle the powder.

How to polish marufun

Gently polish with a taiki or agate burnisher. Use the taiki by laying it on its side. After the initial polishing, apply some migakiko polishing powder and polish for extra shine.

How to polish keshifun

Pull the mawata vertically and horizontally to stretch out the fibers, then form it into a ball. Rotate the mawata across the surface to apply the gold powder, and brush off the excess powder.

Lesson 10

Tools • Materials for Specific Repairs

Get to Know Tools and Materials for Complex Repairs

① **Joshinko**
Use to make the rice glue which will then be blended into ki-urushi to make a lacquer glue called nori-urushi.

② **Kinoko**
Sawdust for mixing with nori urushi to create mold able, putty-like substance called kokuso-urushi.

③ **Kokuso wata**
Use to mix into nori-urushi to make the kokuso-urushi (lacquer putty). The fiber in the kokuso-wata strengthens the putty. Alternatively, cut up small pieces of linen or hemp fabric.

④ **Hemp thread**
Use to reinforce the damaged section of a cup handle, for example. Unwaxed thread works better.

⑤ **Liquid rubber (water soluble)**
A type of liquid latex used when glazing ceramics that creates a water repellent barrier. Wood glue can be substituted. Liquid rubber is better than tape when masking more complicated breakages. Thicker layers are easier to peel off. Because the liquid rubber will quickly ruin paintbrushes, use cotton swabs to apply.

Making glue with a microwave

Joshinko: Mix 1 teaspoon of joshinko + water. Place 3 teaspoons of the joshinko mixture into a heat-safe bowl. Heat in the microwave (about 30 seconds at about 500W). Immediately remove from the microwave when the mixture puffs up and mix for 10 seconds. Heat again before the mixture cools down. The mixture will puff up again. Repeat the heating and mixing step 6 times, and the glue should look like the photo.

When the glue turns lumpy, strain the mixture onto plastic wrap. Once the glue has cooled down, it is ready for use. Stay close to the microwave and keep an eye on the mixture. As soon as it puffs up, remove it from the microwave and stir.

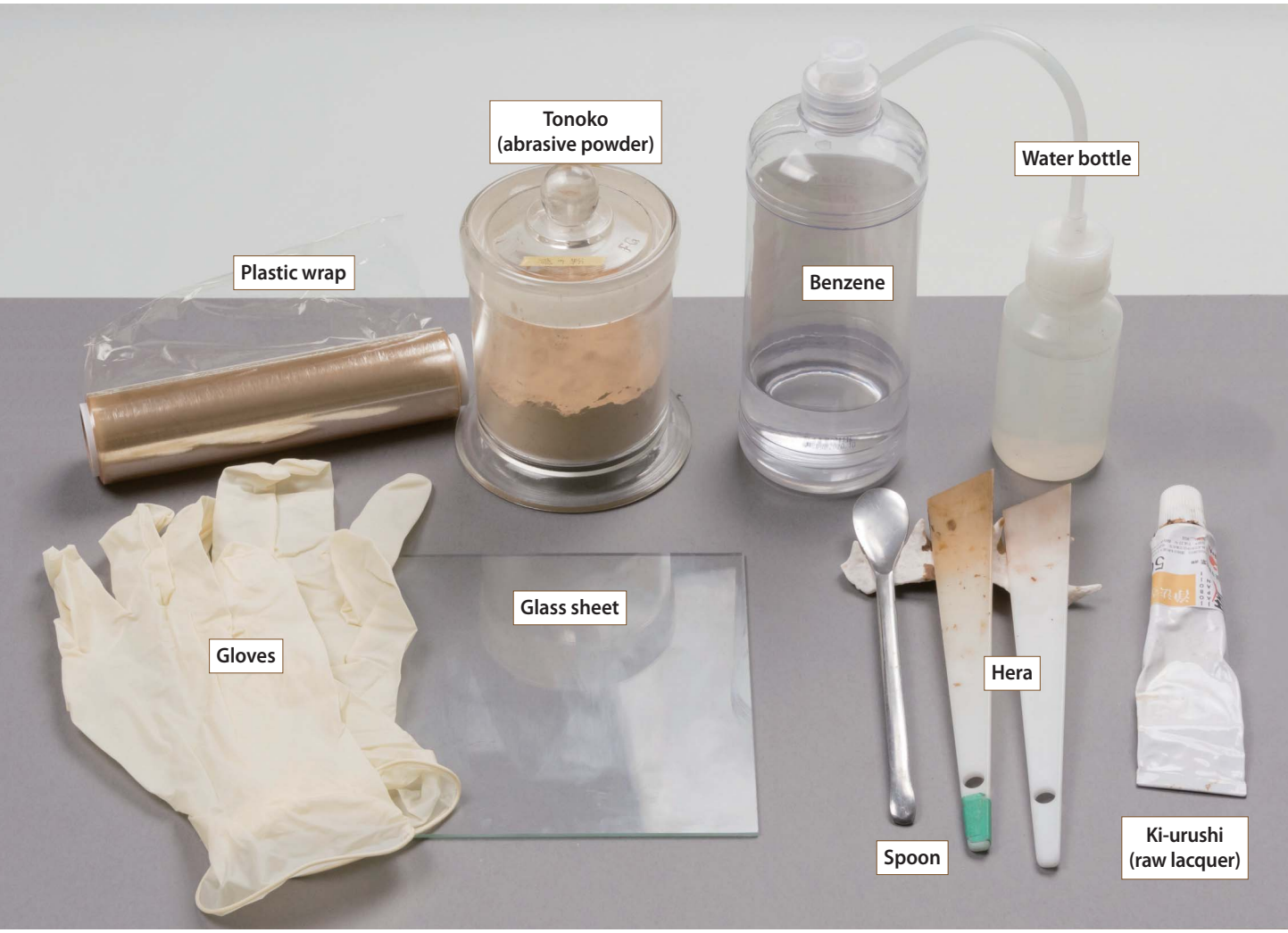
Making glue in a pot

Place joshinko (1 tablespoon) and water (4 tablespoons) into a small pot and mix thoroughly. Cook over low heat and use a hera to continually stir the mixture. When the mixture starts to bubble, remove from heat and continue to stir vigorously. Add little bits of water as needed and continue to stir until the mixture is slightly transparent. As a final step, add about double the amount of water and stir for an additional 20 to 30 minutes. Leaving the hardened glue along the edge of the pot and hera, fold the soft glue into plastic wrap. Once the glue has cooled, it is ready for use.

Lesson 11

Urushi for Filling Chips

How to Immediately Seal Sabi-urushi



Combine ki-urushi with tonoko to make the urushi filling

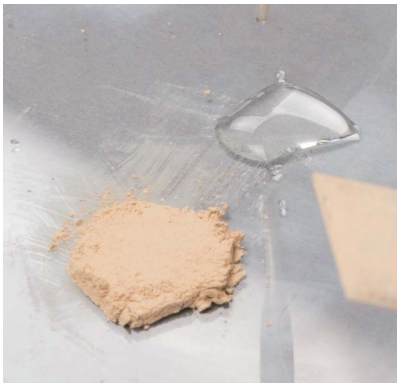
Small chips can be repaired with sabi-urushi. Make the sabi-urushi by mixing ki-urushi, water and kneaded tonoko. The texture and color resembles "sabi" which is the Japanese word for rusted iron.

Although sabi-urushi is used to repair chips, its fine grain and smoothness makes it an excellent material to use as the base coat glass-specific urushi in the preparatory work.

Exposure to air instantly changes the properties of sabi-urushi so it is important to work quickly. Do not used the black and hardened parts of sabi-urushi and utilize the softer parts underneath.

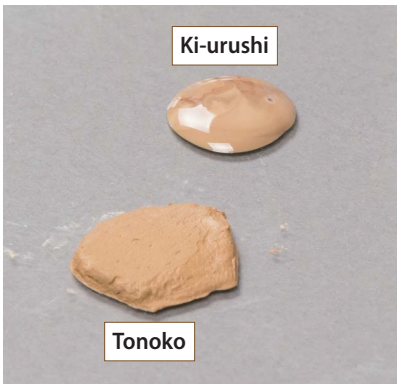
Make the sabi-urushi

1 Place tonoko on the glass sheet. About 2.5grams of tonoko is shown here, but it's easier to start with about 1 teaspoon. Use a hera to gather and crush the tonoko.



2 Pour out a small amount of water next to the crushed tonoko. Eye-ball an amount that is about half the size of the tonoko. Start with a small amount of water and add more as needed.

3 Blend the water into the tonoko and mix until smooth. If there is too much water, use a tissue to soak up the excess water. Knead until it has the consistency of dough and holds its shape.



4 Pour out ki-urushi. The amount should be a little less than the tonoko.

5 Quickly mix in half of the ki-urushi and add the other half.

6 When you spread the mixture with a hera and it looks glossy, the sabi-urushi is ready. Since sabi-urushi will start to oxidize, quickly seal the mixture and use within 2 to 3 days.

Helpful Pointers

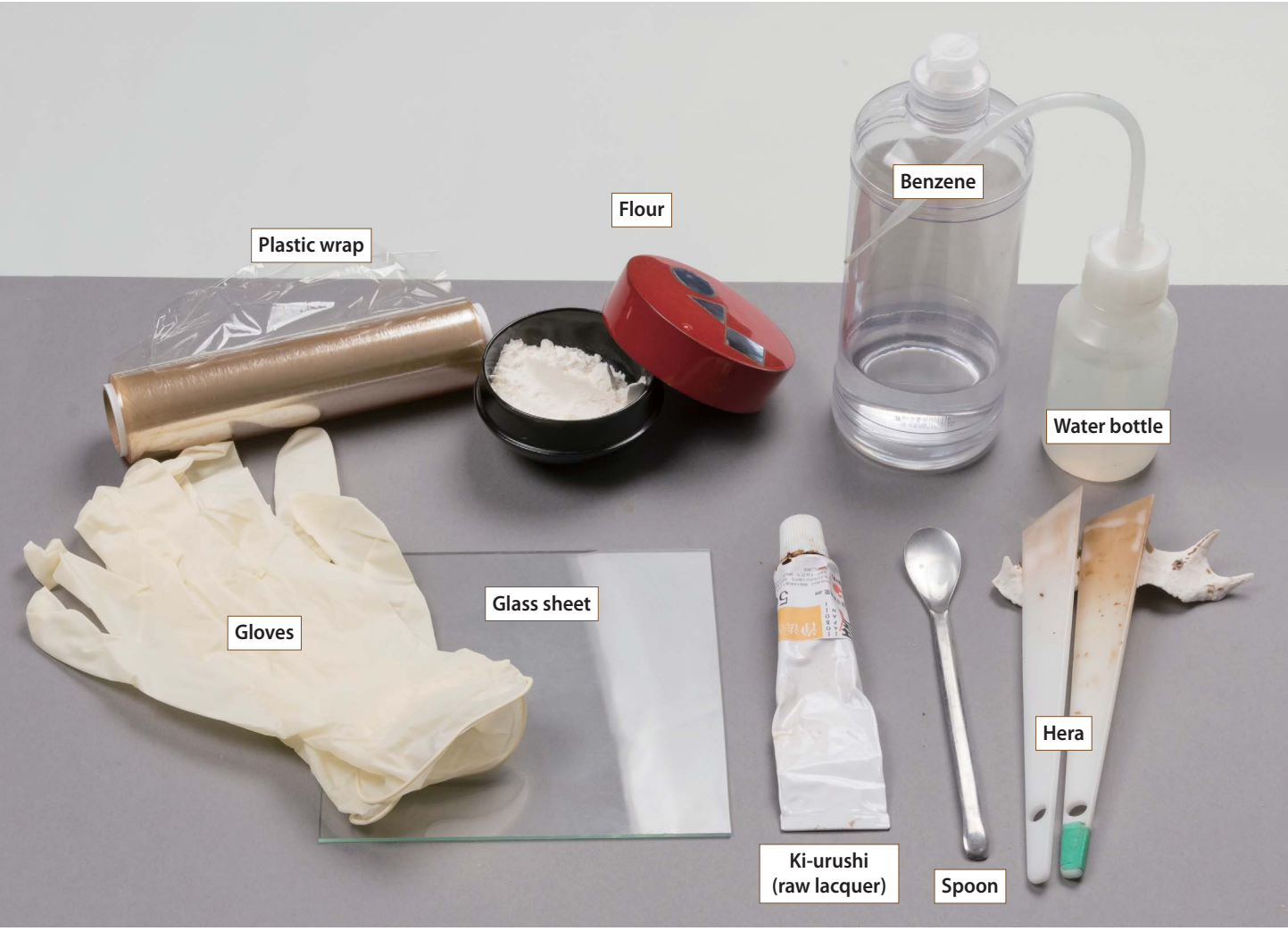
Wrap the Mixture

Once the sabi-urushi mixture is complete, press out any extra air and encase in plastic wrap. Use the edge of the table to scrape the sabi-urushi into the plastic wrap. Write the name of the urushi and date on a piece of tape and stick it onto the plastic-wrapped mixture.

Lesson 12

Urushi as an Adhesive

How to Make the Mugi-urushi More Flexible



The Gluten in the Flour Creates the Adhesiveness

Mugi-urushi combines flour and ki-urushi, kneaded into a glutinous mixture. Because ki-urushi does not have enough adhesive properties on its own, it cannot be used to glue broken pieces together. The addition of the gluten in flour creates the glue-like urushi compound.

Knead until the mixture has a consistency like chewing gum. Knead out extra air, encase in plastic wrap and place in the refrigerator to store. Try to use it up within a week. If you have extra, consider mixing in sawdust to make urushi putty that can be used to repair vessels that tend to stain easily.

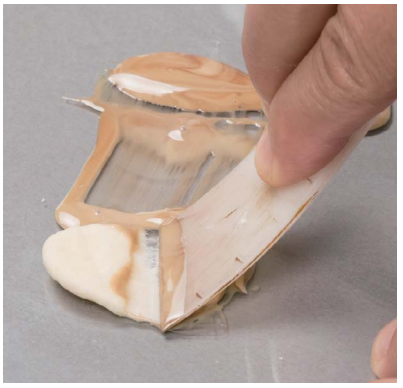
Make the mugi-urushi

1 Place a flour and an approximately nickel-sized amount of water onto the glass sheet. Slowly add water to the flour and knead.

2 Knead until the mixture can be formed into a ball.

3 Once the dough has been kneaded, enclose it with plastic wrap and leave at room temperature for about 30 minutes. Clean the glass sheet.

4 Unwrap the flour dough and flatten it onto the glass sheet. Pour out a dollop of ki-urushi next to the dough.



5 Start by adding half of the ki-urushi to the dough. Be aware that adding too much urushi makes the mixture slippery and difficult to handle.

6 Knead firmly to activate the gluten, which makes the dough stretchy. If there is not enough elasticity, add more ki-urushi and continue kneading.

Helpful Pointers

Having Two Heras to Create the Urushi Mixtures is Handy

When making mugi-urushi or sabi-urushi, the mixtures stick to the hera and can prevent thorough blending. Using two heras will allow you to better scrape and combine the materials.

Lesson 13

Get to Know Urushi

Understanding the Properties and Value of Urushi

Photo credit:
Akita — Kawatsura Paint;
Jiro Kotobuki [not sure about this name] —Fumiyuki Sato

Urushi Transforms when Placed in Controlled Humidity and Temperature

Urushi is cultivated from the sap of the Urushiol tree and is a one-of-a-kind, 100% natural raw lacquer that can be used as paint and glue. Depending on the country or region of origin, the components of the raw lacquer may differ. In Japan, China and Korea, urushiol is the most common type of tree harvested, and the Japanese urushi is considered the best. However, over 98% of the urushi used in Japan is imported from China and less than 2% is native Japanese urushi. (nowadays, however, the younger generation in the Japanese lacquer industry is resurrecting abandoned areas of urushi production).

Once an urushiol tree has been planted, it takes approximately 10 years of growth before the urushi sap can be collected. Each tree yields only 200ml (about 7 ounces) or so of sap, and its scarcity has generated nicknames like “urushi tears” and “urushi blood." Let’s be conscientious and mindful of how we use this precious natural resource.

Kintsugi involves a process of “curing” the urushi, and this entails placing the urushi-coated vessel in an environment of controlled temperature and humidity. The temperature will need to be over 78°F/20°C and the humidity level between 70-80%. Take the time to get to know the properties of urushi as you practice kintsugi.

About urushi rash

Most people develop a rash when the urushi touches the skin. Although there are some people who have no reaction to urushi, it’s a good idea to always wear rubber gloves when handling urushi, especially for beginners. Areas with thicker skin like your palm will not typically break out in a rash, but other more sensitive parts of your hands may be affected. Prevention is key, and consider covering your arms in addition to wearing gloves.

Should urushi accidentally touch your skin, use cooking oil to immediately wipe it off. Once the urushi has been removed with oil, cleanse the area with soap and water. If the skin starts itching or if a rash develops, please consult a medical professional.

PART 2

Repairing Small Fragments

Lesson 14

Chipped Pottery (Part 1) Oribe-Style Glazed Small Bowl

How to Carefully Repair Small Chips Along the Rim of the Bowl

Assess the Damage

The lip of a bowl often chips when it is stacked with other bowls. First, assess the damage (how big is the chip, is it an area that will get dirty, etc.), then repair it with sabi-urushi.

Each time the hardened lacquer is shaved, apply diluted ki-urushi to the spot with a tissue. This is a critical step in the basic process, so be sure to master the technique.

Repairing small chips is an ideal starting point for the novice kintsugi practitioner. Follow the step-by-step instructions to gain the confidence to restore a valued vessel.

The flow of LESSON 14

Approximately 2 weeks to complete repairs

1. Prepare for sabi-tsuke, the application of sabi-urushi
2. Sabi-tsuke: apply sabi-urushi to chipped sections (filling)
3. Sabi-kezuri ~ sabi-tsuke (shave and apply sabi-urushi)
   Repeat until the chips are filled
   → Outside 2-3 Days
4. Kurororiro-urushi base coat glass-specific urushi ~ nakanuri (middle coat)
   Muro 30 Minutes → Outside 1-2 Days
5. Paint the e-urushi coat for funmaki, the powder sprinkling
   Outside 15-60 Minutes
   Funmaki: Sprinkle gold marufun #5 and #3
   Muro 1-2 Days
6. Fungatame: Hardening the powder (ki-urushi)
   Muro 2-3 Days

   Sanding and polishing

※ Outside = Outside of the muro Muro = Place in the muro

Bowl DATE

Name: Oribe-style glazed small bowl
Base material: Pottery
Glaze condition: Glaze is intact and smooth
Size: 3⅛″ (8cm) x 3½″ (9cm)
Opening: 2″ (5cm) height
Damage: Two small chips

STEP ❶
Prepare for sabi-tsuke, the application of sabi-urushi

1 Assemble the chipped bowl, glass sheet and hera. Wear gloves.

2 Soak a wipe with benzene. (Wipes work better since they don't produce fuzz the way tissue does.)

3 Thoroughly wipe the chipped section, glass sheet and hera with benzene.

4 Pour enough sabi-urushi for the repair onto the glass sheet. Cover with the hera to minimize air exposure.

5 Make sure not to apply too much sabi-urushi in one go. As shown in the photo, scoop a small amount of sabi-urushi onto the hera to slowly fill each individual chipped section.

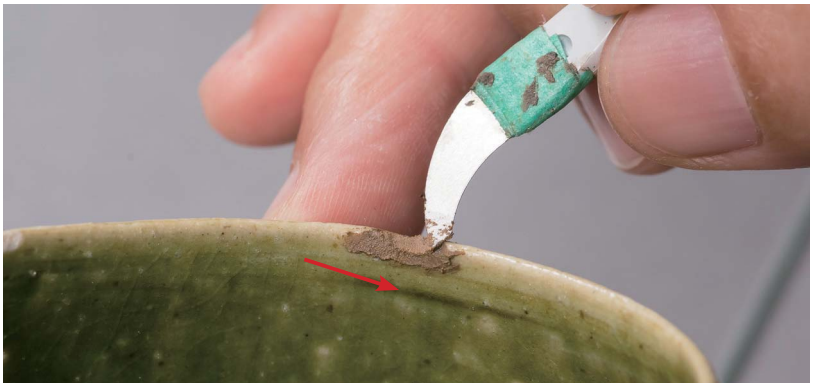
Helpful Pointers

Try a variety of tools to apply sabi-urushi

For mending small chips, an appropriately small filling tool is helpful. Explore assorted tools to use as heras such as wooden skewers, toothpicks, and popsicle sticks.

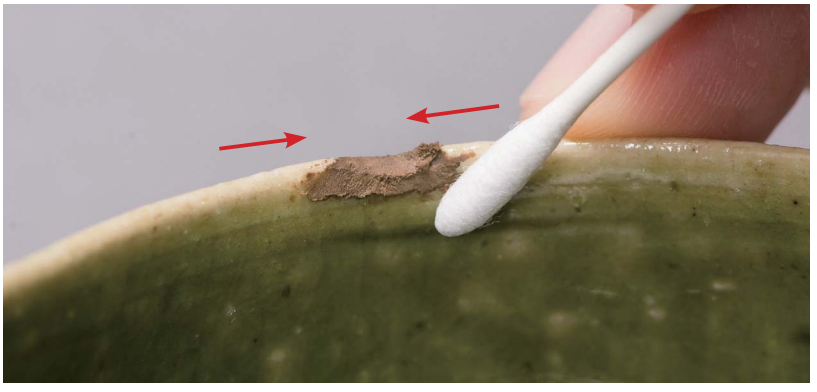
STEP ❷
Prepare for sabi-tsuke: the application of sabi-urushi to the chipped sections (filling)

6 Use a small hera and a little bit of sabi-urushi and begin filling the chipped area by rubbing in the urushi.



7 Clean the hera, then horizontally spread the applied urushi from left to right. The hera can be made of metal, plastic or bamboo.

8 Using a cotton swab, adjust the urushi that has spilled out of the chipped area.

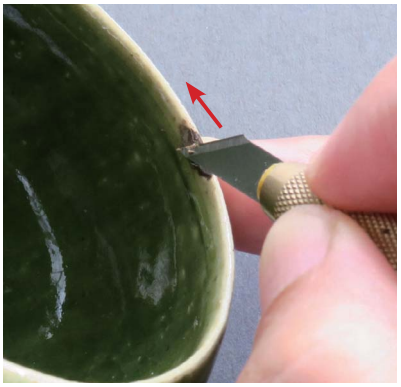


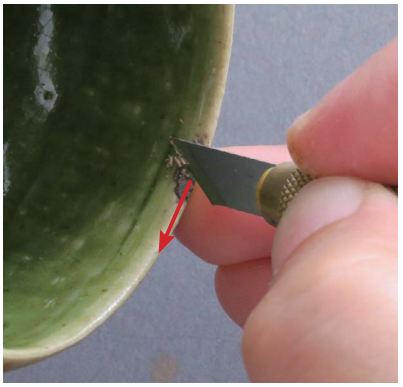
9 Continue shaping the urushi towards the chipped section. If you were able to fill the chip without spillage using the hera, there is no need to use the cotton swab.

10 If you need to use a cotton swab to adjust the filling, do it immediately after applying the sabi-urushi. The urushi will start to seep into the cotton swab and if you wait too long, the filling will fall apart when you try to reshape it.

11 The first application of sabi-tsuke is complete. Place the bowl in a well-ventilated area for 2 to 3 days.

STEP 3
Sabi-kezuri ~ sabi-tsuke (shave and apply the sabi-urushi)





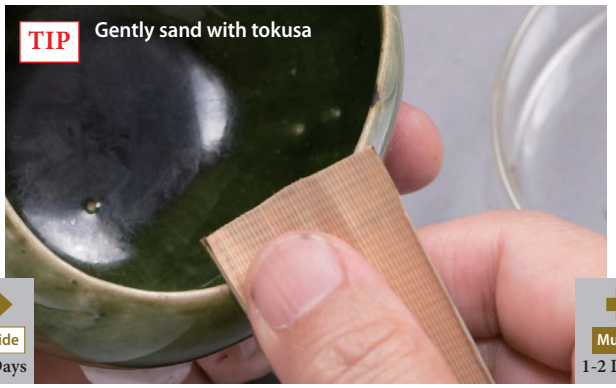
12 Once the sabi-urushi has hardened, any excess urushi will need to be shaved with a craft knife. Make sure to move the blade away from you as you shave the top edge. Shave thin layers of the sabi-urushi. Once the filling is smooth, shave off any other excess urushi.

13 Lay the blade horizontally and shave a little at a time. Be careful not to remove the glaze.

14 Dilute ki-urushi with an equal amount of kerosene and apply to the filled area. This strengthens the filling and improves adhesion of the next layer of sabi-urushi. Remove any excess diluted ki-urushi with tissue.

15 The second sabi-tsuke.

16 Determine the final shape of the filling during the second phase of shaving. Split open a tokusa and immerse in water. After the second shaving, rub the area with the water-infused tokusa to sand it down. Tokusa is a gentle abrasive insert period.



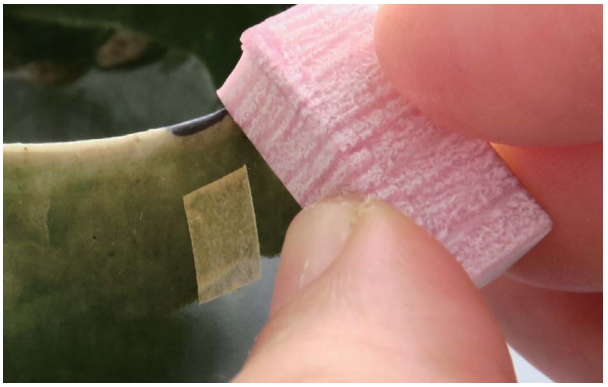
17 To deal with any remaining unevenness, apply another layer of sabi-urushi. The filling is nearly complete so only apply the sabi-urushi where needed.

18 The third shaving. Once you've chiseled the area gently sand again. Then apply the diluted ki-urushi. Repeat this process as often as needed to fully fill the chipped areas.

STEP 4
Kurororiro-urushi base coat glass-specific urushi ~ nakanuri

19 Once the sabi-urushi filling is complete, apply a kuro-roiro-urushi base coat glass-specific urushi. Kuro-roiro-urushi has excellent coverage. Apply a thin layer since thick layers will cause the urushi to shrink.

20 When the base coat glass-specific urushi is complete, turn the vessel upside down. Place in the muro for about 30 minutes, then take it out and allow the kuro-roiro-urushi to fully cure.



21 Lightly sand with a piece of microfinishing film (superfine) wrapped around an eraser. Press the area with a cloth after sanding to remove any residue.

22 Paint the nakanuri (the middle layer) with kurororiro-urushi. At this point the repair is complete. If your aim is for the black lacquer look, the vessel is done.

Helpful Pointers

Shaving sabi-urushi

Do not start shaving from the outer edge. This will cause the entire filling to fall out and you will need to start over with the sabi-urushi filling process. Or you could try to reattach the filling piece with the mugi-urushi glue. Select the fix that would be most appropriate for the situation.

STEP 5
Paint the e-urushi coat for funmaki, the powder sprinkling ~ sprinkle the powder

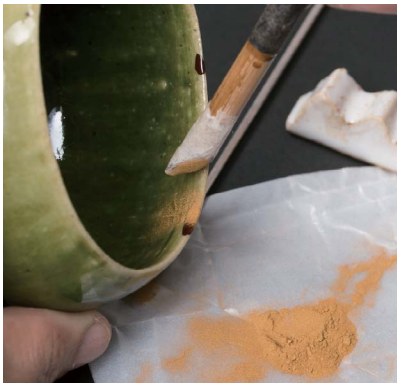
23 Sand the painted surface with the microfinishing film (superfine).

24 Wipe with benzene.

25 To enable the gold powder to adhere, paint a coat of e-urushi. Strain any impurities in the e-urushi with miyoshino paper.

26 Paint the e-urushi with a thin flat brush. A thick layer will cause the surface of the urushi to shrink, which you want to avoid.

27 The e-urushi coat is complete here. Place in a dust-free area for 15 minutes to an hour until the e-urushi is in the ideal state for sprinkling the gold powder.



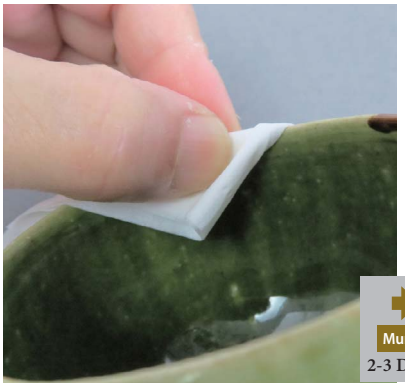
28 Pour the gold powder (marufun #5) into the fundzutsu and start sprinkling onto the painted surface before the e-urushi dries.

29 Gently gather the gold powder onto the e-urushi section with the harai kebo, then sweep off any loose powder. Keep the loose marufun #5 together in a pile.

30 Follow up with the finer gold powder (marufun #3) and use the harai kebo to embed the powder into the surface. You should now have a thicker, gleaming layer of gold powder.

STEP 6
Fungatame: hardening the powder (ki-urushi) ~ sanding and polishing

31 Initiate fungatame 1 or 2 days after sprinkling the powder. Use the tip of a brush to soak in the ki-urushi onto and between the gold powder.



32 Press with a tissue about 3 times, making sure to apply the clean part of the tissue each time until no urushi is soaked up.

33 Lightly sand with a piece of micro-finishing film (fine). Take care not to damage the gold powder layer.

34 Use the taiki to gently polish the surface some more. Alternatively, use amor for the polishing step.

35 Apply a thin layer of cooking oil to the repaired area, then add a little bit of migakiko (powder abrasive) and polish. Keep polishing with the tissue to a high shine.

36 Complete. Wait about 2 weeks before using the repaired vessel.

Helpful Pointers

Sample urushi finishes

Paint gold powder, silver powder and e-urushi onto glass slides. These will help determine which decorative urushi finish would best complement the vessel. Think of them as paint chips for kintsugi.

Lesson 15

Chipped Pottery (Part 2) Soto-Yakishime Bowl

Protect Unglazed Vessels with Masking Tape

Use masking tape to prevent urushi from accidentally staining unwanted areas

Ceramic and porcelain plates and cups are typically glazed. The extremely high temperatures during firing melts the glaze and forms a thin glass layer on the vessel surface. The glazing adds durability and protects the vessel from water damage and staining from foodstuffs and other elements. Tape to prevent urushi from accidentally staining unwanted areas.

When repairing vessels with the kintsugi method, be aware that when cooking oil is not applied to the surface, the urushi will seep in and removal will be difficult. Adding masking tape ensures an extra measure of protection to keep the urushi contained in the mending area.

The flow of LESSON 15 Approximately 2 weeks to complete repairs

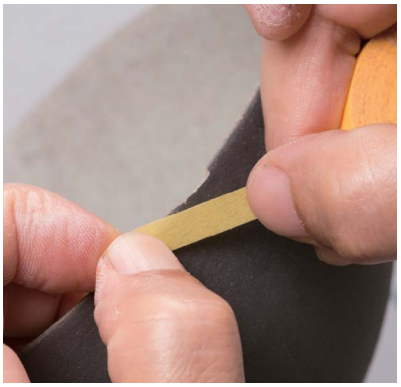
1	Apply Sabi-urushi after adding masking tape (filling)	
2	Sabi-kezuri and Sabi-tsuke (Shave and apply sabi-urushi)	Outside 2-3 Days
3	Kuroroiro-urushi base coat glass-specific urushi ~ nakanuri	Muro 30 Minutes → Outside 1-2 Days
	Paint the base coat glass-specific urushi (kuroiroro-urushi + ki-urushi) for the funmaki (sprinkling of gold powder)	Outside 15-60 Minutes
4	Funmaki: Sprinkle silver keshifun with mawata	Outside 1 Day → Muro 3-4 Days

※ Outside = Outside of the muro Muro = Place in the muro

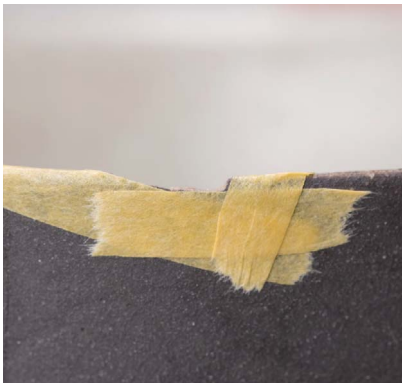
Bowl DATE

Name: Soto-Yakishime bowl
Base material: Pottery
Glaze condition: The interior has a matte glaze; the black slip exterior is unglazed
Size: 6⅛″ (15.5cm)
Opening: 3″ (7.5cm) height
Damage: A slightly bigger chip (1 spot)

STEP ❶
Apply sabi-urushi after adding masking tape (filling)

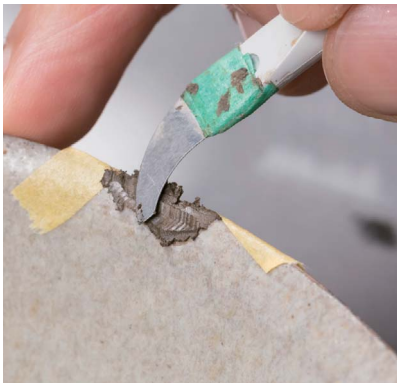


1 Wipe the mending area with benzene, then cover the sections outside of the mending area with masking tape. This prevents the urushi from staining the unglazed parts of the bowl.

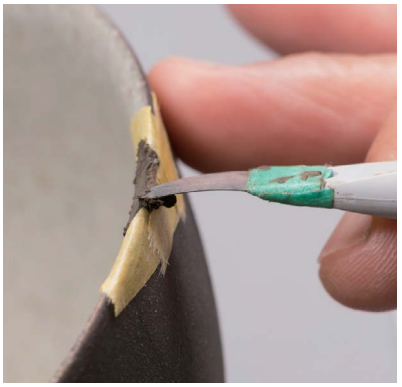


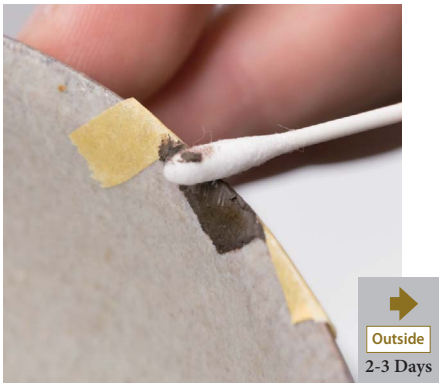
2 Masking is complete. No need to mask the inside of the bowl, which is glazed.

3 To create the filling, add a little bit of tonoko to the sabi-urushi. The tonoko increases the adhesion of the filling, which is helpful when the chips are larger or if the rim of the bowl is thin and easily chipped. If you do not have tonoko on hand, using just the sabi-urushi is fine. Make sure to repeatedly harden the sabi-urushi with diluted ki-urushi.



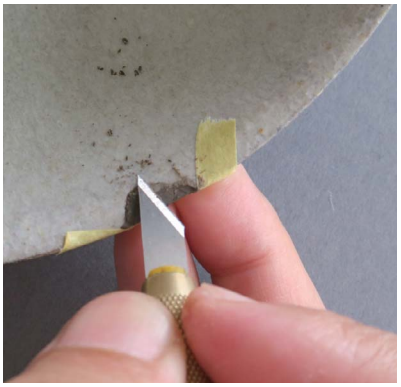
4 Fill the chipped area with sabi-urushi. Slowly build up thin layers of the urushi. Thickly applying the sabi-urushi will prevent the inside from fully hardening and the internal urushi may leak out.





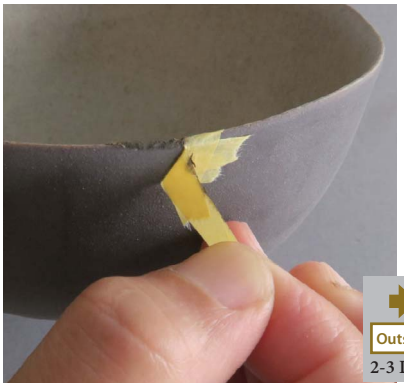
5 Gently press with a cotton swab to shape the sabi-urushi filling edge. The first sabi-tsuke is complete. Place in a well-ventilated area for 2 to 3 days.

STEP ❷
Sabi-kezuri ~ sabi-tsuke (shave and apply sabi-urushi)



6 When the filling has fully hardened, shave to fine-tune the shape. Move the blade from the inside of the filling outward, a little at a time.

7 After shaving the filling, soak with diluted ki-urushi and press with a tissue. Place in the muro for about 30 minutes and proceed with the second sabi-tsuke. Because the rim of the bowl is very thin, take care when forming the filling edge. Start by adding more filling on the inside of the bowl, then press down any filling that spills on the exterior side of the bowl. Shape the filling to match the rim of the bowl.



8 Replace the masking tape after applying the sabi-urushi. Be careful not to remove the filling along with the tape.

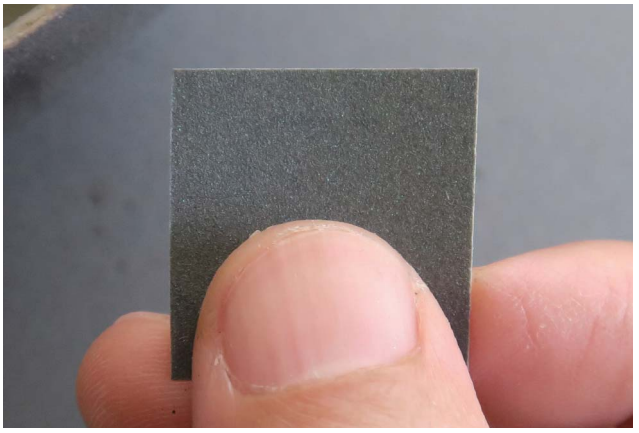
9 The second sabi-kezuri. Due to the thinness of the bowl's rim, use a waterproof sandpaper (600 grit) on just the urushi section. Soak with diluted ki-urushi.

10 Fill in the small bumps with more sabi-urushi. Sand the hardened filling with waterproof sandpaper and soak with diluted ki-urushi. Place in the muro for a day.

Helpful Pointers

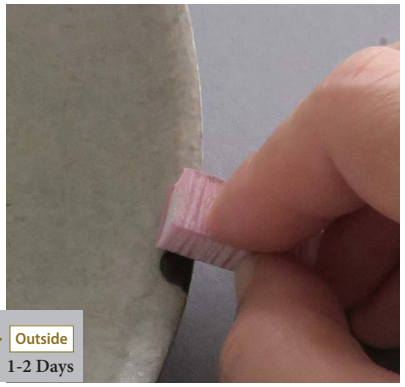
Use waterproof sandpaper to gently sand the filling and avoid staining the other parts of the vessel

For bowls with a thin rim, using a blade will break off the filling during the sabi-kezuri phase. Because the bowl is unglazed and the mending area is delicate, the vigorous sanding required makes tokusa unsuitable. For all these reasons, waterproof sandpaper works best.



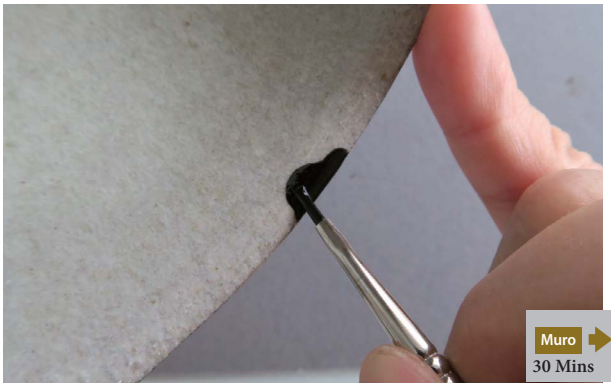
STEP 3
Kurororiro-urushi base coat glass-specific urushi ~ nakanuri

11 Paint a thin base coat glass-specific urushi of kurororiro-urushi, making sure to avoid the unglazed exterior.



12 Wrap a piece of microfinishing film (superfine) on an eraser and lightly sand.

13 Apply the nakanuri layer with kurororiro-urushi. Use a thin brush to outline the filling shape.



14 Use a flat brush to pull the painted outline inward to fill in the shape. Once the kurororiro-urushi has hardened, the repair is complete.

15 Sand and smooth out the surface with microfinishing film (superfine).

16 Mix the kurororiro-urushi and ki-urishi, strain and load a brush. Use a thin brush to outline the shape, then fill in the shape with a flat brush. Make sure to form thin layers. Then place in a dust-free area for 15 minutes to an hour, checking for the ideal urushi state to sprinkle the silver powder (during the hot summer months, 15 minutes should be enough).

STEP ❹
Funmaki: Sprinkle silver keshifun with mawata

17 Gently sprinkle the silver powder (keshifun) with a mawata.

18 Barely touch the mawata to the surface as you sprinkle the powder.

19 Rotate the mawata to gently polish and set the silver powder. The mawata will easily snag on unglazed or bumpy surfaces, so compress the mawata into a small ball as you sprinkle the powder.

20 Complete. Wait one day before placing in the muro. Then place the vessel in the muro for 3 to 4 days to fully cure the urushi. Please wait about 2 weeks before using the mended vessel.

Helpful Pointers

Silver powder contrasts nicely against black urushi

The effect of the gold and silver powder will vary depending on the color of the underlying urushi. Gold is especially vibrant against the reddish e-urushi. Black urushi showcases the luster of silver. Adding ki-urushi to kuroroiro-urushi strengthens the lacquer (use a 1:1 ratio).

Lesson 16

Chipped Pottery (Part 1) White Porcelain Drape Cup

How to Apply Diluted Ki-urushi Before Sabi-tsuke

Mix kerosene into ki-urushi to make the diluted ki-urushi

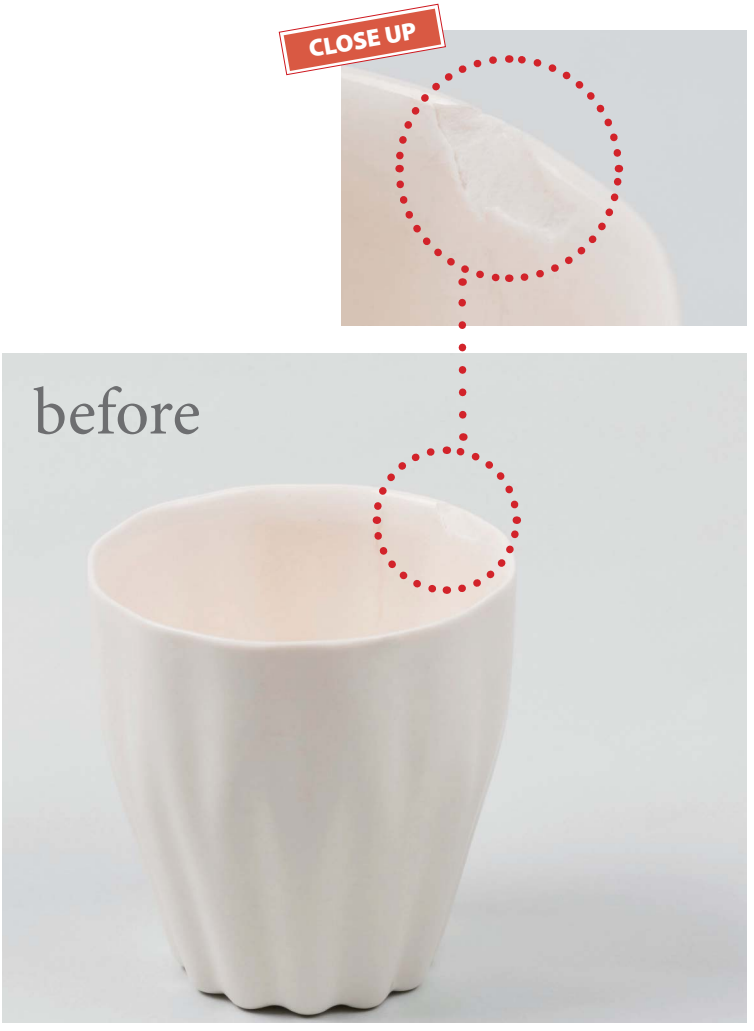
Compared to pottery, porcelain does not absorb urushi as well. As such, the sabi-urushi may detach from the chipped area. To prevent this and to increase adhesion, dilute ki-urushi with kerosene and apply it to the chipped area before filling with the sabi-urushi. Because this chip is a little bigger than the previous project, add some tonoko into the first layer of sabi-urushi to create a denser filling. If tonoko is not available, it's fine to proceed with just the sabi-urushi as long as you apply a layer of diluted ki-urushi between each sabi-urushi layer. Pour some diluted ki-urushi into thin cracks to assess the depth of the crack.

The flow of LESSON 16 Approximately 3 weeks to complete repairs

1	Apply diluted ki-urushi and sabi-tsuke (filling)	
2	Sabi-kezuri and Sabi-tsuke Repeat until the chipped area is filled	Outside 2-3 Days
3	Kurororiro-urushi base coat glass-specific urushi ~ nakanuri	Muro 30 Minutes ➡ Outside 1-2 Days
4	Apply urushi (kurororiro-urushi + ki-urushi) to prepare for funmaki	Outside 15-60 Minutes
	Funmaki: Sprinkle silver marufun #5 and #3	Muro 1-2 Days
	Fungatame (roiro-urushi + ki-urushi)	Muro 2-3 Days
	Shave, sand and polish	

※ For cracks, refer to LESSON 18

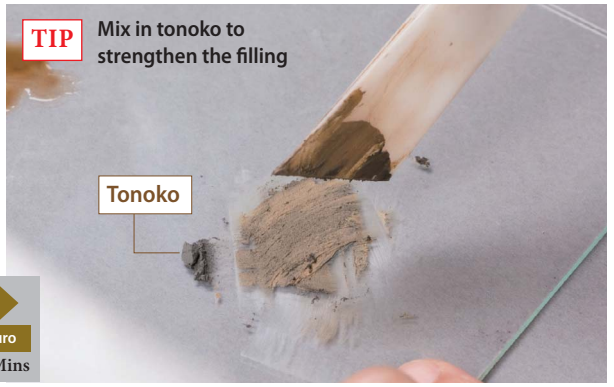
※ Outside = Outside of the muro Muro = Place in the muro



Vessel DATE

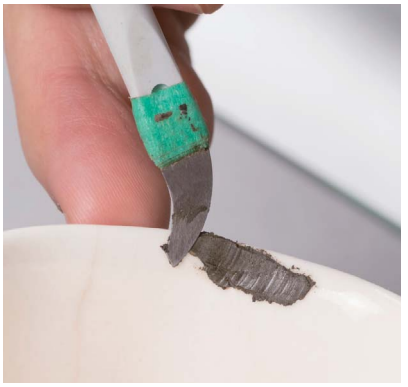
Name: White porcelain drape cup
Base material: Porcelain
Glaze condition: Glaze is intact and smooth
Size: 3⅛″ (8cm)
Opening: 3⅛″ (8cm) height
Damage: A bigger chip (1 spot) + crack

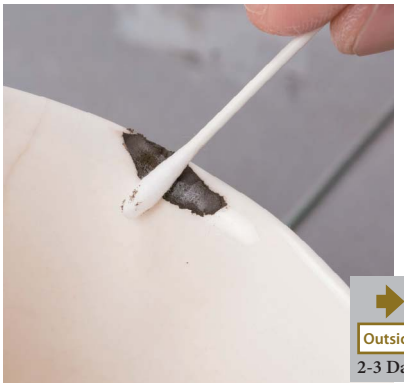
STEP 1
Apply diluted ki-urushi and sabi-tsuke (filling)



1 Apply diluted ki-urushi (1:1 ratio of ki-urushi and kerosene) on the chipped section only. Press tissue onto painted area and place in the muro for approximately 30 minutes. The painted section will turn brown in the muro.

2 Mix sabi-urushi and a little bit of tonoko.





3 Use a hera to fill the chipped area with the sabi-urushi and tonoko mixture.

4 Use a cotton swab to shape the filling to fit the chipped area. Flatten and smooth out uneven parts of the filling.

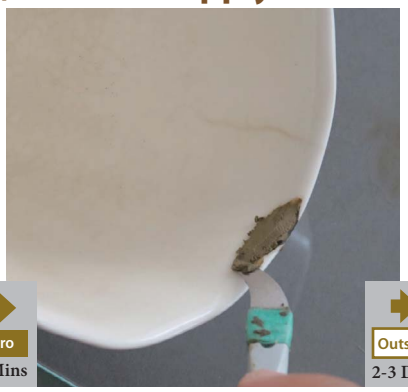
Helpful Pointers

Harden the filling with diluted ki-urushi after sabi-kezuri

After applying the diluted ki-urushi, press the area with a tissue. Place in the muro for about 30 minutes before applying the sabi-urushi. Before proceeding to the next phase of painting the base coat glass-specific urushi, place in the muro for at least a day to fully cure the filling.

STEP ❷
Sabi-kezuri ~ sabi-tsuke (shave and apply sabi-urushi)

Muro
30 Mins



Outside
2-3 Days

5 Once the filling has cured, shave with a blade. Start inside the filling and shave outward. Wipe with a cloth and apply diluted ki-urushi.

6 Add sabi-urushi where needed (2nd sabi-tsuke). Sabi-urushi tends to shrink while it cures, so form a slightly rounded shape.

7 The second sabi-kezuri. Since the vessel's interior is curved, use a curved blade as well.

Outside
2-3 Days

8 Next, sand with tokusa and wipe off with a cloth. Repeat this process several times. Apply the third round of sabi-urushi on just the bumpy parts.

9 The third sabi-kezuri. If tokusa is not available, use a 600-800 grit waterproof sandpaper. Apply diluted ki-urushi.

10 Apply diluted ki-urushi onto the thin crack. Once the diluted ki-urushi has been absorbed into the crack, wipe off any excess.

Helpful Pointers

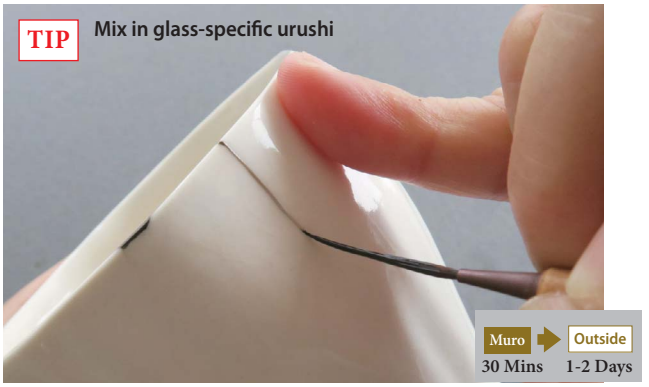
Close the windows during sabi-kezuri

As you shave the sabi-urushi, sweep the shaved powder with an clean dry paintbrush. The shavings have not cured yet and could cause rashes. Avoid scattering the powder into the air by keeping all windows closed.

STEP 3
Kurororiro-urushi base coat glass-specific urushi ~ nakanuri

11 Paint a base coat glass-specific urushi of kurororiro-urushi. Outline the chipped area with the lacquer and fill in the shape by pulling the painted outline inward.

12 Attach a piece of microfinishing film (superfine) on your index finder and lightly sand the surface. After sanding, press with a cloth.



13 Paint the nakanuri layer with kurororiro-urushi.

14 Blend in urushi that is meant for glass into the kurororiro-urushi and apply a base coat glass-specific urushi to the cracked section. The addition of the glass-specific urushi increases the adhesion between the glaze and urushi. When the urushi has cured, the mending is complete.

Helpful Pointers

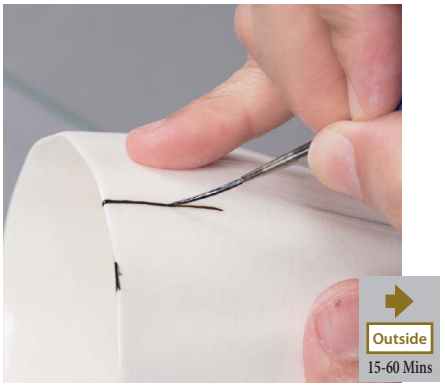
Even if the timing of sprinkling the powder is off or the sabi-kezuri doesn't go well or the funmaki somehow falls flat in some way, you can always redo kintsugi.

The exception is with Yakijima or other unglazed, matte vessels, which will become stained.

STEP 4
Apply urushi (kurororiro-urushi + ki-urushi) to prepare for funmaki ~ polish

15 Polish the surface with the micro-finishing film (superfine).

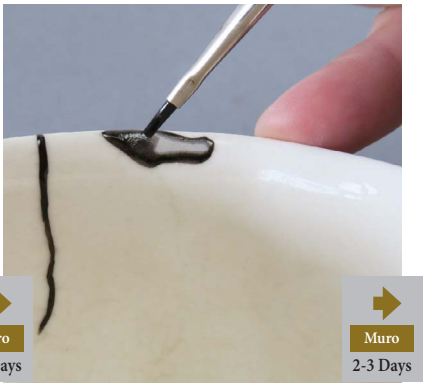
16 Paint the strained mixture of kurororiro-urushi and ki-urushi. Work from interior to exterior to prevent smudging.



17 Once the interior has been painted, paint the exterior side of the crack.

18 Before the lacquer hardens, sprinkle silver powder (marufun #5) with a piece of mawata. Collect all the loose powder.

19 Sprinkle the silver powder with the smaller granules (marufun #3) using the harai kebo.



20 For the fungatame step mix kurororiro-urushi and ki-urushi. Apply to seep into the silver powder. Dab with tissue to soak up excess urushi. Repeat with clean tissue until all excess urushi is absorbed.

21 Polish with fine microfinishing film, then continue at a horizontal angle with the taiki. If desired, polish some more with amor.

22 Apply a thin layer of cooking oil on the repaired area. Add a little bit of tonoko to a tissue and polish to a high shine.

23 Complete. Wait about 2 weeks before using the repaired vessel.

Lesson 17

Chipped Pottery (Part 2) White Porcelain Flower-Shaped Small Dish

Chipped Pieces May be Used as Part of the Repair, Depending on the Condition and Shape

Retain as much as possible of the pieces that have broken off

For vessels with small chips, start by filling the damaged area with sabi-urushi. However, if the breakage results in salvageable fragments, keep the pieces to incorporate into the repair. Keep in mind that depending on the size and shape of the broken pieces, they may not reintegrate with the vessel very well and will not be ultimately used, but it's a good idea to have the pieces on hand just in case.

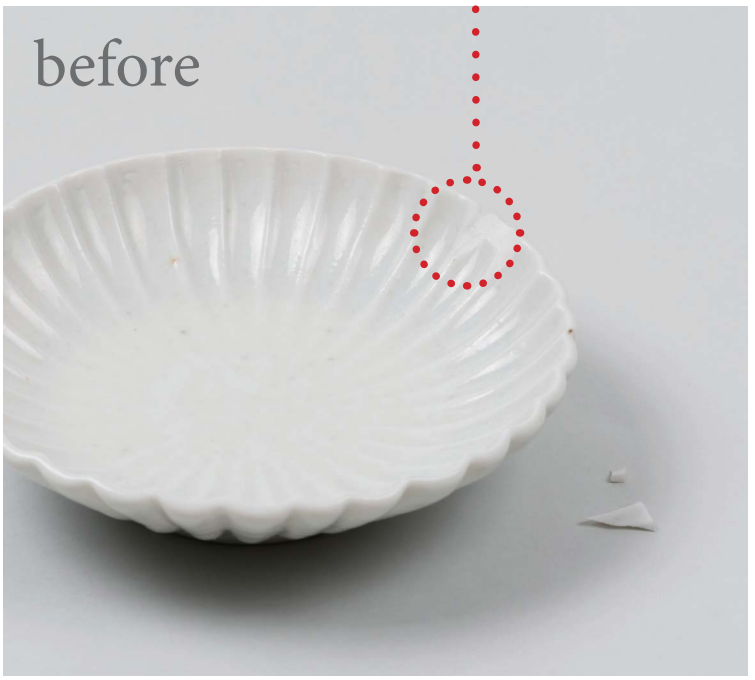
For this dish, domestic urushi meant for glass is used to attach the fragments. If this particular type of urushi is not available, the standard urushi works fine. Make sure to align the pieces during the attachment step and avoid distorting the shape of the vessel.

The flow of LESSON 17 Approximately 1½ months to complete repairs

1	Surface preparation ~ Attach fragments (glass-specific urushi)	Muro 2~4 Weeks
2	Sabi-tsuke (filling) – sabi-kezuri (shaving) Repeat until chipped area is filled	Outside 2-3 Days
3	Kuroroiro-urushi base coat glass-specific urushi ~ nakanuri	Muro 30 Minutes ➡ Outside 1-2 Days
4	Paint a layer of e-urushi to prepare for funmaki	Outside 15-60 Minutes
5	Funmaki: Sprinkle gold marufun #5 and #3	Muro 1-2 Days
	Fungatame (ki-urushi)	Muro 2-3 Days
	Shave, sand and polish	

※ Outside = Outside of the muro Muro = Place in the muro

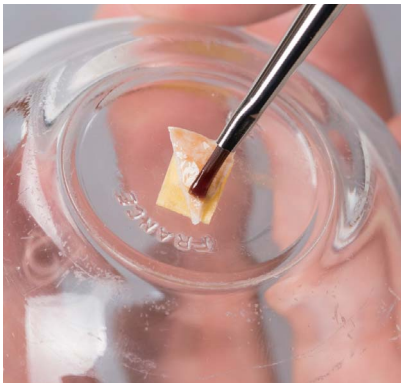
CLOSE UP



Vessel DATE

Name: White porcelain flower-shaped small
Dish base material: Porcelain
Glaze condition: Glaze is intact and smooth
Size: 4⅛″ (10.5cm)
Opening: 1″ (2.5cm) height
Damage: Deep chipped area and fragments

STEP 1
Surface preparation ~ attach fragments (glass-specific urushi)



1 Apply diluted ki-urushi onto the fragments and corresponding spot on the dish, then press the area with tissue. (If using urushi meant for glass, this step may be omitted.)

2 Determine where the fragments fit best.

3 Apply the glass-specific urushi on the fragment.

4 Apply the glass-specific urushi on the dish as well. Then place in the muro (approximately 30 minutes).

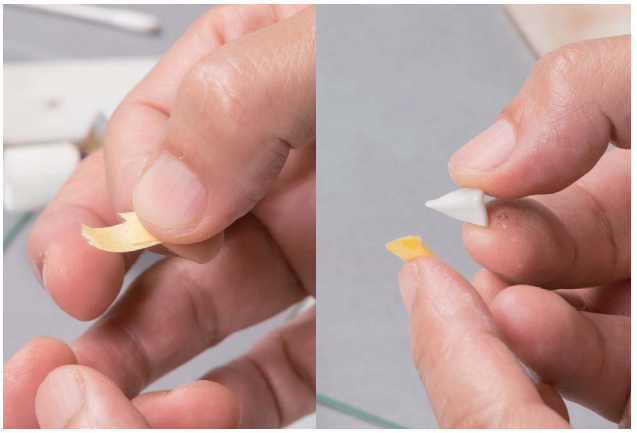
5 Remove the dish from the muro and use tweezers to attach the fragment to the dish.

6 To ensure that the fragment doesn't shift, use a wooden block or similar object to angle the dish (gravity will affect the repair if the vessel is on a flat surface).

Helpful Pointers

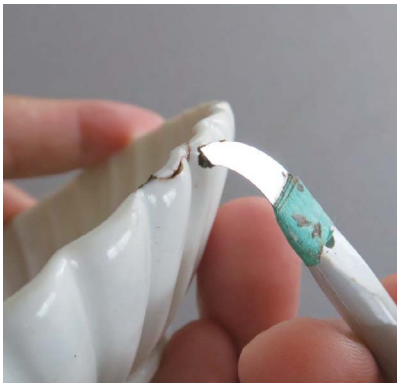
Secure small pieces with tape before applying urushi

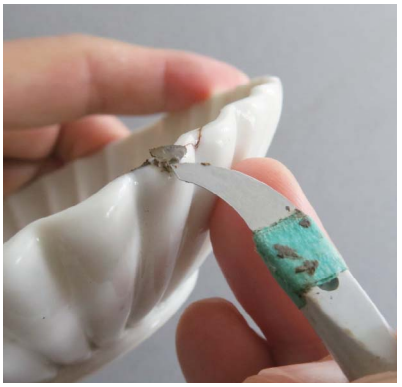
It can be difficult to paint small fragments. A helpful tip is to roll a piece of tape with sticky side out and affix it to the side of the fragment that will not be attached. The taped fragment will stick to your finger while you apply the urushi.



STEP ❷
Sabi-tsuke (filling) ~ sabi-kezuri

7 When both fragments have been attached, fill the chipped area with sabi-urushi. Try to maintain the integrity of the vessel shape as you form the filling.





8 There is a small opening that is visible on the exterior. Press in the sabi-urushi to fill the opening, then use a cotton swab to adjust the filling shape.

9 The first sabi-kezuri. Due to the curved ridges on the dish, use a curved blade to shave the urushi. Apply diluted ki-urushi.

10 The second sabi-kezuri. Repeat the previous steps for the second sabi-kezuri and the third sabi-tsuke.

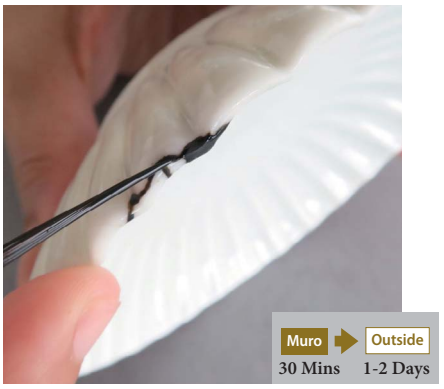
STEP 3
Kurororiro-urushi base coat glass-specific urushi ~ nakanuri

11 For this dish, a curved blade works well for shaving. Then use a rolled up 600-800 grit waterproof sandpaper to sand the area. After sanding, wipe clean with a cloth.

12 Finalize the shape by scraping the blade along the edge (start at the tip between porcelain and filling). Then apply the diluted ki-urushi.

13 Mix in the glass-specific urushi with the kurororiro-urushi and apply a base coat glass-specific urushi along the edges of the mended fragments. fine glass-specific urushi to the sabi-urushi filling.

14 Lightly sand with a piece of microfinishing film (superfine) wrapped around an eraser. Press the area with a cloth after sanding to remove any residue.

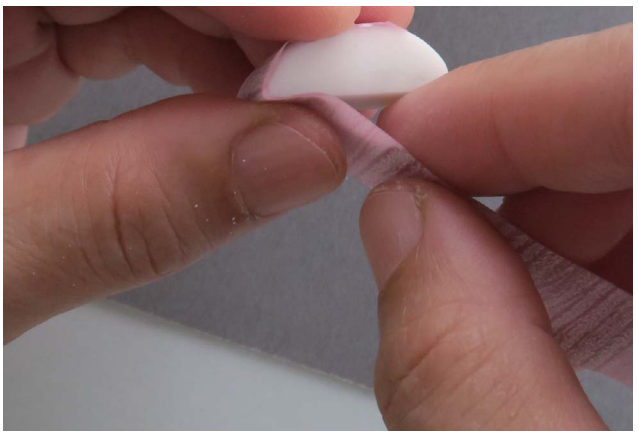


15 Paint the nakanuri (the middle layer) with kurororiro-urushi. When the urushi has dried and cured, the repair is complete.

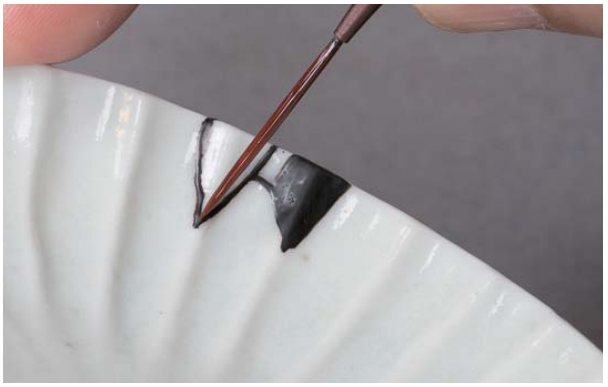
Helpful Pointers

Adjust the shape of the eraser based on the vessel shape

The key to successful sanding with microfinishing film is to adjust the shape of the eraser based on the vessel shape. A square or rectangular shape is fine for sanding outer edges, but for this flower-shaped dish, forming the eraser into a half moon shape is more effective.

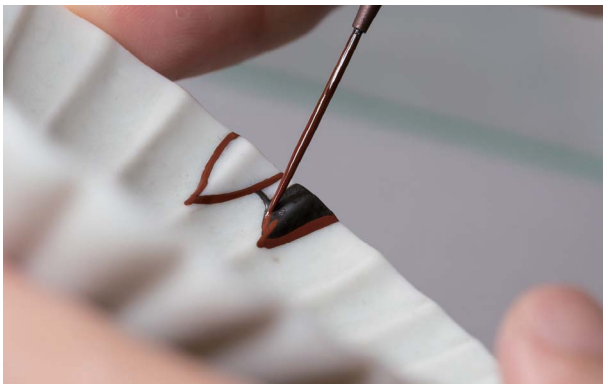


STEP 4
Paint a layer of e-urushi to prepare for funmaki



16 Paint along the mended seams with strained e-urushi.

17 Be careful not to paint outside of the edge.



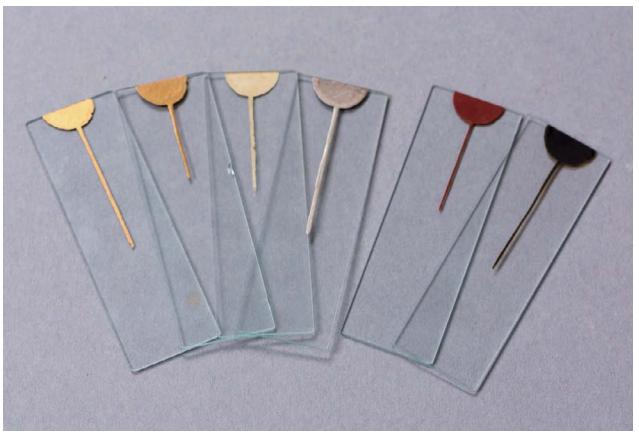
18 Paint the filling as well. Start by painting the outline, then with a flat brush fill in the shape in a thin layer.

19 The e-urushi layer is complete. Wait for the appropriate time to sprinkle the gold powder.

Helpful Pointers

Having 6 variations of the sample urushi finishes is handy

There are six possible combinations for finishes. For the decorative powder, you may want gold or silver, and for each color there is a shiny version (marufun) and a more matte version (keshifun). The underlying urushi layer of e-urushi or kuroroiro-urushi will affect the finish as well. Having a sample of all 6 combinations is very helpful.



STEP 5
Funmaki with gold marufun #5 and #3 ~ polish

20 Sprinkle gold powder (marufun #5) with a fundzutsu.

21 Make sure to sprinkle gold powder on the exterior as well. Collect all the loose powder with a harai kebo.

22 Next, use the harai kebo to press in the gold powder (marufun #3).

23 Proceed with fungatame about 1 to 2 days after funmaki. With the tip of a paintbrush, let the ki-urushi soak into the gold powder layer.

24 Dab about three times with a tissue to soak up the ki-urushi. Use the clean parts of the tissue for each dab.

25 Affix the microfinishing film (fine) to your pinky and sand gently. Be careful not to scratch up the gold layer.

26 Polish horizontally with the taiki. Polish some more with amor if desired.

27 Apply a thin layer of cooking oil to the repaired area, then add a little bit of migakiko (powder abrasive) and polish. Keep polishing with the tissue to a high shine.

28 Complete. Wait about 2 weeks before using the repaired vessel.

PART 3

Mending Cracks

Lesson 18

Cracked Porcelain – White Porcelain Cup

Allow the Urushi to Seep into the Crack

Dilute the ki-urushi with kerosene and apply to the crack

Because it's difficult to gauge the depth of a crack with the naked eye. Even if it may seem like a shallow fracture at first glance, over time the crack may deepen and cause leakage.

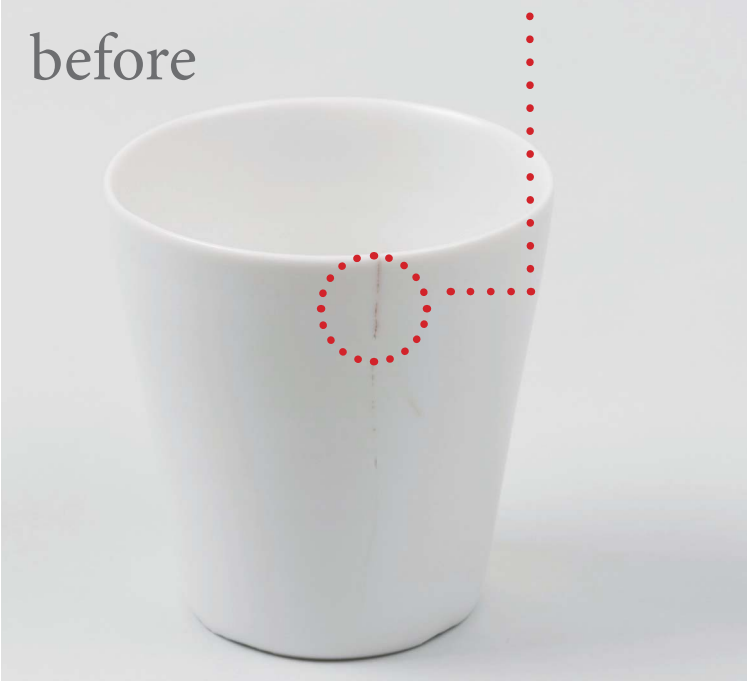
With this in mind, the first step is to assess the crack. Load a thin brush with ki-urushi and allow droplets to seep into the crack to ascertain its depth. For hairline cracks, the ki-urushi alone may be too thick, so dilute it with kerosene first.

The flow of LESSON 18

Approximately 1½ weeks to complete repairs

1	Apply ki-urushi	Muro 2 Weeks
2	Reapply ki-urushi (2nd round, 3rd round)	Muro 1 week x 2 (1 week per ki-urushi application)
3	Base coat glass-specific urushi (kurororiro-urushi + glass-specific urushi)	Muro 30 Mins ➡ Outside 2-3 Days
4	Lightly sand and apply nakanuri layer Fill in little bumps	
5	Paint the e-urushi coat for funmaki	Outside 15 – 60 Minutes
6	Funmaki: Sprinkle gold keshifun with mawata	Outside 1 Day ➡ Muro 3-4 Days

※ Outside = Outside of the muro Muro = Place in the muro

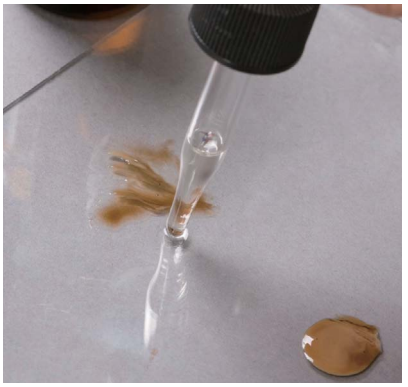


Vessel DATE

Name: White porcelain cup
Base material: Porcelain
Glaze condition: Glaze is intact and smooth
Size: 3″ (7.5cm)
Opening: 3⅛″ (8cm) height
Damage: A long crack from top to bottom

STEP ❶
Apply ki-urushi

1 Dot along the crack with ki-urushi from the inside of the cup. The urushi should gradually sink in.



2 The thinner, shallower parts of the crack will not absorb the ki-urushi, so dilute the ki-urushi.

3 Apply the diluted ki-urushi.

4 Cracks that are not initially visible will become apparent as the ki-urushi sinks in. Using the absorbed ki-urushi as a guide, continue to apply the ki-urushi down the length of the crack.

5 After the ki-urushi application, wait about 30 minutes to allow for full absorption.

6 After 30 minutes, verify that the ki-urushi has seeped all the way through to the exterior of the cup.

STEP ❷
Reapply ki-urushi (2nd and 3rd round)

7 Wipe off any excess urushi with a cotton swab. Wipe with the clean sections of the swab and keep the urushi along the crack.

8 Make sure to wipe the interior as well. Wipe the sections outside of the crack with benzene. After the first urushi application, place in the muro for at least 2 weeks.

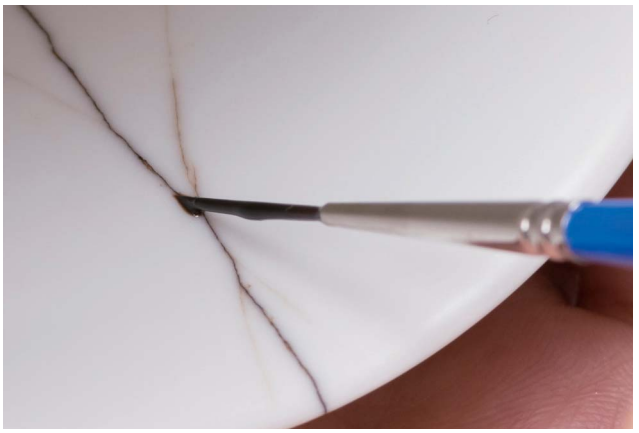
9 The second application of diluted ki-urushi. After application, wipe off any excess diluted ki-urushi. Place the cup on its side in the muro for 1 week.

10 The third application. When the ki-urushi no longer soaks in, this phase of applying ki-urushi is complete. Place in the muro for approximately 1 week.

Helpful Pointers

Use a thin brush to apply the urushi into the cracks

It's easier for the urushi to soak into the cracks if you use the tip of a thin brush. Other uses for old brushes include painting sabi-urushi and embedding gold and silver powder onto surfaces.

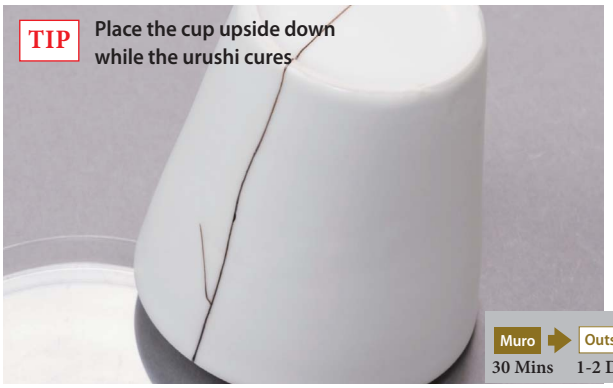


STEP 3
Base coat glass-specific urushi with kurororiro-urushi + glass-specific urushi



11 Apply a mixture of kurooriro-urushi and glass-specific urushi as a base coat glass-specific urushi along the crack. Applying the base coat glass-specific urushi to the inside of the vessel can be difficult and may require trying different sized brushes at various angles. (1:1 ratio of kurororiro-urushi and glass-specific urushi.)

12 Make sure to apply a base coat glass-specific urushi to the crack at the bottom.

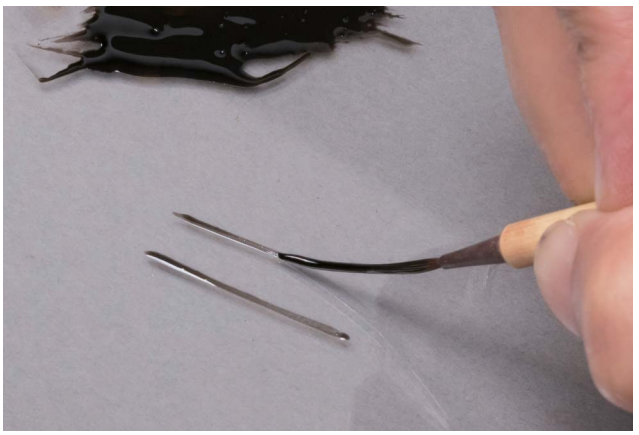


13 Place the cup upside down.

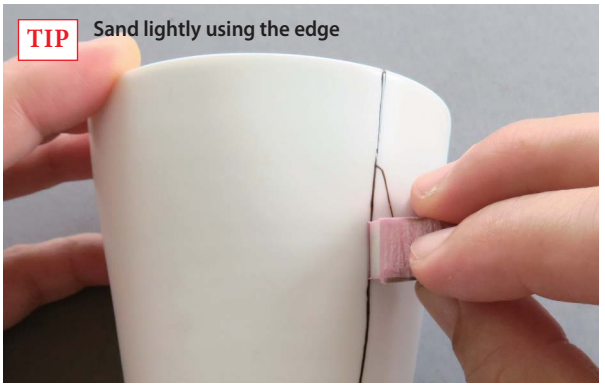
Helpful Pointers

Practice painting thin lines on the glass sheet

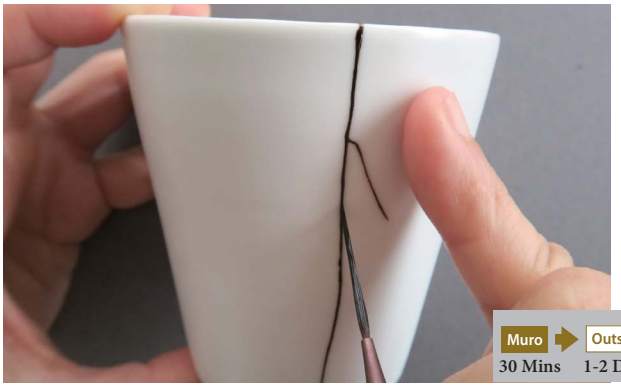
It can be tricky to get the hang of painting thin lines. Just before applying the base coat glass-specific urushi, practice thin brush-strokes on the glass sheet. If you move the brush too fast, the line may blur or become uneven, so take even breaths as you slowly paint the line.



STEP 4
Lightly sand and apply the nakanuri layer



14 Lightly sand with a piece of microfinishing film (superfine) wrapped around an eraser. Use the edge of the eraser to make sanding easier.



15 Paint the nakanuri layer with kororoiro-urushi.

16 Once the nakanuri is complete, the repair process is nearly done; however, there are some uneven parts of the painted urushi.

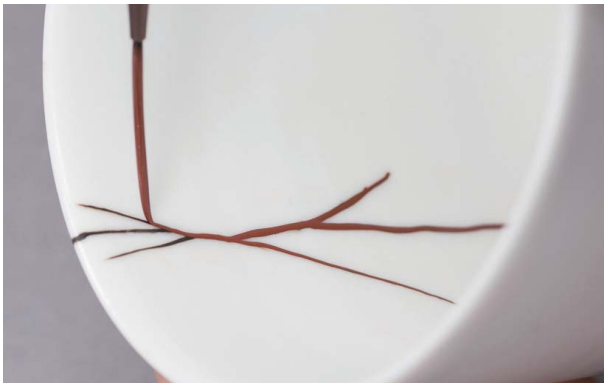
17 Any unevenness will affect the finish, so fill missed spots with additional kuroroiro-urushi.

18 Repeat the entire nakanuri layer to smooth out any unevenness.

19 Mending is complete. Position with the painted side facing up.

STEP 5
Paint the e-urushi coat for funmaki

20 Sand with the microfinishing film (superfine), then apply strained e-urushi in preparation for the sprinkling of gold powder.



21 The depth of the cup can be challenging to paint, so carefully vary the angle as you apply the e-urushi.

22 The long handle of a menso brush (a type of Japanese calligraphy brush) is useful because the brush tip remains steady even if your hand trembles a bit.

23 The e-urushi layer has been painted. You will need to sprinkle the gold keshifun before the layer dries.

Helpful Pointers

E-urushi can be shaved after the powder sprinkling

Painting the thin, delicate lines along cracks is very challenging. If the e-urushi layer goes outside of the designated line, you can shave it after the gold powder has been sprinkled and hardened. You'll be able to shave any mistakes with a sharp blade. Use a wipe rather than a tissue to try to wipe the urushi off as tissue will cause smearing

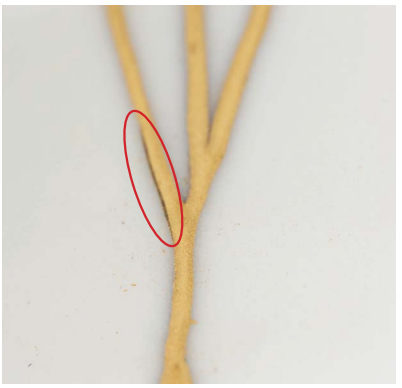
STEP 6
Funmaki: Sprinkle the gold keshifun with a mawata

24 Start sprinkling the gold powder (keshifun) on the inside of the cup. Your hand will most likely not fit so use a harai kebo to sprinkle the powder.

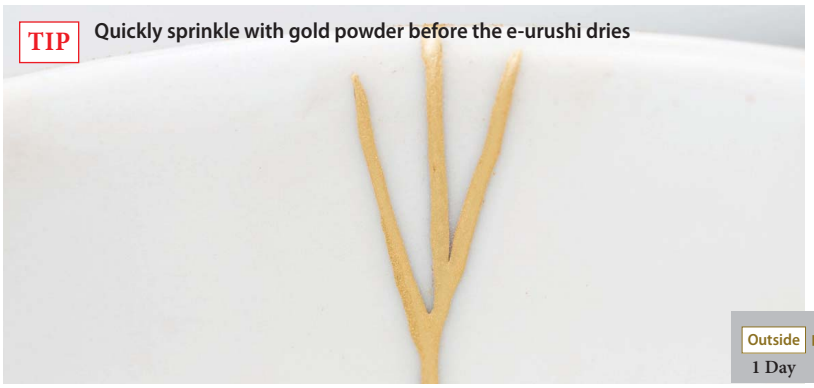
25 Barely touch the mawata to the urushi to lightly spread the gold powder.

26 Sweep the excess loose gold powder with a harai kebo, if desired.

27 Rotate the mawata to gently polish and set the gold powder to the surface.



28 You may see kuroroiro-urushi spots showing where the e-urushi didn't cover them. Paint over the black spots with e-urushi.



29 Immediately sprinkle with gold powder on the newly painted e-urushi spots. The photo shows the even finish. Gently polish the powdered area. Leave out for one day, then place in the muro for 3 to 4 days to cure.

30 Complete. Wait about 2 weeks before using the repaired vessel.

Lesson 19

Different Types of Cracks

Notice the Beauty in the Accidental Fracture as You Engage in the Repair

Adjust the mending method based on the condition of the crack and glaze

One of the delights of kintsugi is finding the beauty in the cracks and fissures of broken vessels. This beauty emerges accidentally and suddenly, though it can look as though it was intentionally created. There is no need for distracting, artificial decorations. Indeed, embracing of the natural occurrence and investing in heartfelt, appreciative mending make the process and object even lovelier.

To repair a crack, the first step is to soak it with ki-urushi. If the glaze is intact, there is no problem with this step. Sometimes, however, the vessel may be unglazed or the types of glaze can stain easily. It's important to apply the ki-urushi directly to the cracked area as much as possible. Despite your best efforts, the ki-urushi may extend beyond the crack and spread out to unwanted areas, particularly if the clay is soft. In such cases, the best approach is to think of the "Amamori Chawan" (The famous Japanese bowl with multitudes of stains on its glaze) and accept any stains and imperfections as part of its charm.

PART 4

Mending Fragments

Lesson 20

Pottery Fragments (Part 1) Oribe-style Glazed Fin Cup

After Applying the Mugi-urushi, Fuse with Humidity

Roughen the fragment edges to increase adhesion

To repair broken fragments, use a glue made out of flour, ki-urushi and water called "mugi-urushi." Use enough mugi-urushi to stick the pieces together and fill any spaces between the fragments. This will prevent the pieces from shifting. In order to make the fragmented pieces stick together, roughen up the edges first.

After applying mugi-urushi, wait to attach the fragments. The humidity in the air will cure and strengthen the urushi glue, so wait a minimum of 30 minutes before attaching the pieces.

The flow of LESSON 20

Approximately 1½ weeks to complete repairs

1	Apply mugi-urushi to the fragmented areas	Outside 15-60 Minutes
2	Attach ~ Check for any misalignment	Outside 2-4 Weeks
	Shave excess urushi Apply diluted ki-urushi	Muro 1 Week
3	Apply basecoat (e-urushi + glass-specific urushi)	Muro 30 Mins ➡ Outside 1-2 Days
	Paint the urushi layer (kuroroiro-urushi + ki-urushi) to prepare for funmaki	Outside 15-60 Minutes
4	Funmaki: Sprinkle silver keshifun with the harai kebo	Outside 1 Day ➡ Muro 3-4 Days

※ Outside = Outside of the muro Muro = Place in the muro

Vessel DATE

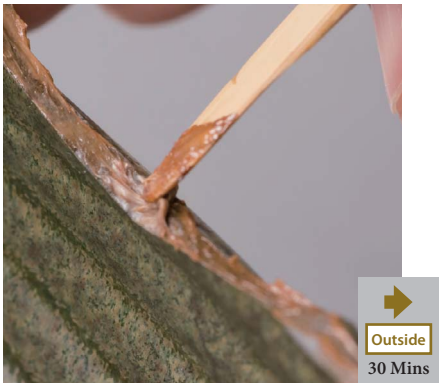
Name: Oribe-style glazed fin cup
Base material: Porcelain
Glaze condition: Glaze is intact and smooth
Size: 3⅛″ (8cm)
Opening: 3⅛″ (8cm) height
Damage: A clean break

STEP ❶
Apply mugi-urushi to the fragmented areas

1 Prepare the fragment edges with a diamond bit to enable better adhesion of the broken pieces.

2 Adding roughness to the fragments will help the urushi stick to the edges.

3 Apply the diluted ki-urushi to the fragmented edges, then press with a tissue. Next, place in the muro for 30 minutes.



4 Apply just enough mugi-urushi to cover the edges. A flexible bamboo hera is an ideal tool for this. Wait about 30 minutes to an hour to attach the pieces together.

Helpful Pointers

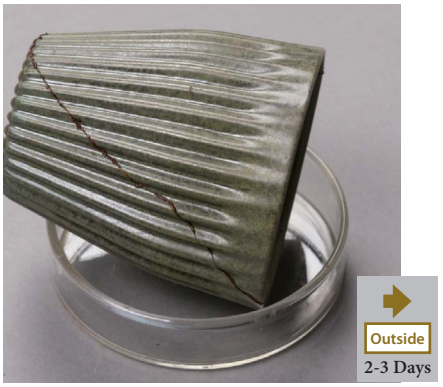
Cover urushi with plastic wrap when not in use

When mugi-urushi is exposed to the oxygen in the air, the color turns black. Unlike sabi-urushi, you do not need to cover the urushi with a hera while working with the lacquer, we recommend covering mugi-urushi with plastic wrap when not is use to avoid the shifting of color.

STEP ❷
Attach ~ check for any misalignment

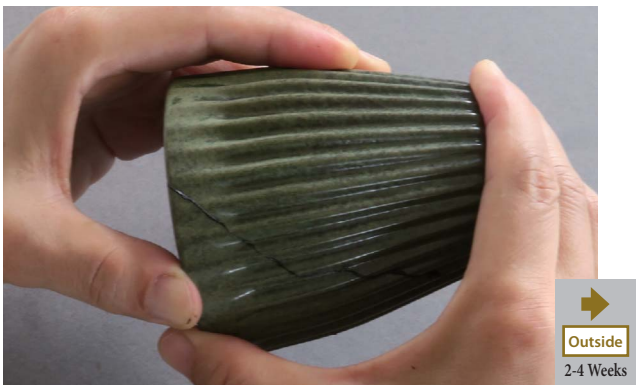
5 After a while, the oxygen and humidity in the air will increase the stickiness of the urushi glue.

6 Firmly attach the fragments together. Apply enough pressure for the urushi to seep out.



7 Place on its side for 2 to 3 days outside of the muro. Allow the urushi that has seeped out to dry. Dry urushi is easier to remove.

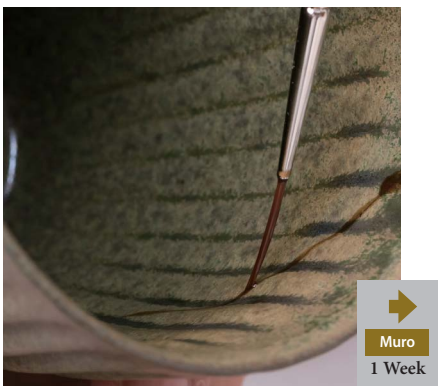
8 Check that the attached pieces are aligned by removing a bit of the urushi with the hera. Since all the extra mugi-urushi will be shaved off later, just remove a small section to check for any misalignment.



9 If the pieces are aligned, press them together firmly to close any gaps. Place the vessel on its side and let the urushi cure for 2 to 4 weeks.

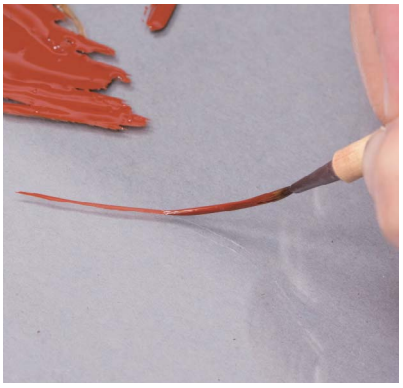
10 Once the urushi has cured, shave off the excess mugi-urushi. Be careful not to scratch up the vessel.

11 Sand the glued section with the tokusa.



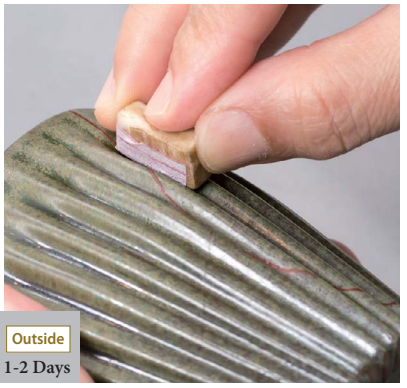
12 Soak the glued section with diluted ki-urushi from the inside. Repeat from the outside. Wipe off excess urushi and place in the muro for 1 week.

STEP 3
Apply basecoat (e-urushi + glass-specific urushi) ~ paint the urushi layer to prepare for funmaki



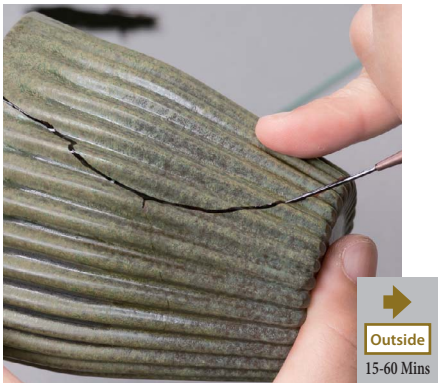
13 Mix e-urushi with glass-specific urushi. Practice painting lines on the glass sheet before applying the mixture to the vessel.

14 Apply the e-urushi along the glued section. When done, place in the muro for 30 minutes, the leave out for 1 to 2 days.



15 Now we will prepare for sprinkling the silver powder. Wrap a piece of microfinishing film (superfine) around an eraser and sand the e-urushi area.

16 Wipe off any dust or sanded particles with benzene.



17 Strain a mixture of kurororiro-urushi + ki-urushi and paint a layer over the e-urushi on the inside, then on the exterior. Starting on the inside prevents accidental smearing of the urushi. Wait until the ideal time to sprinkle the silver powder.

Helpful Pointers

Avoiding missed spots

When painting a dark vessel with kurororiro-urushi, the painted area is hard to distinguish from the vessel's surface and some spots may be unpainted. By using the reddish e-urushi as a guiding base coat glass-specific urushi, you can avoid this problem. Get creative with the various urushi colors to make the painting process easier. In addition to e-urushi, another option for a color that may stand out against a dark vessel is to add some white urushi to create a gray hue.

STEP 4
Funmaki: Sprinkle silver keshifun with the harai kebo

18 Sprinkle the silver powder (keshifun) on the inside first.

19 Tap the harai kebo with your middle finger to shake off the silver powder.

20 Sprinkle the silver powder on the outside as well. You can use a mawata for the outside if you prefer.

21 Spread the silver powder on top of the urushi with a sweeping gesture. Make sure not to get any urushi on the brush hairs.

22 Gently rotate the mawata frequently to polish.

23 Complete. Leave out for a day, then place in the muro for 3 to 4 days to fully cure. Wait about 2 weeks before using the repaired vessel.

Lesson 21

Pottery Fragments (Part 2) Sometsuke Rice Bowl

Temporarily Hold Fragments in Place, then Glue with Mugi-urushi

Assemble the pieces to figure out how to glue them together

When there are various sized fragments, piece together and temporarily hold in place with masking tape. This will help determine if there are any sections missing. This pre-assembly will also guide the mugi-urushi gluing order.

For this rice bowl, start by attaching the largest pieces and then fill in with the smaller ones. The next step is to soak diluted ki-urushi into the cracks (refer to page 58 for mending cracks)

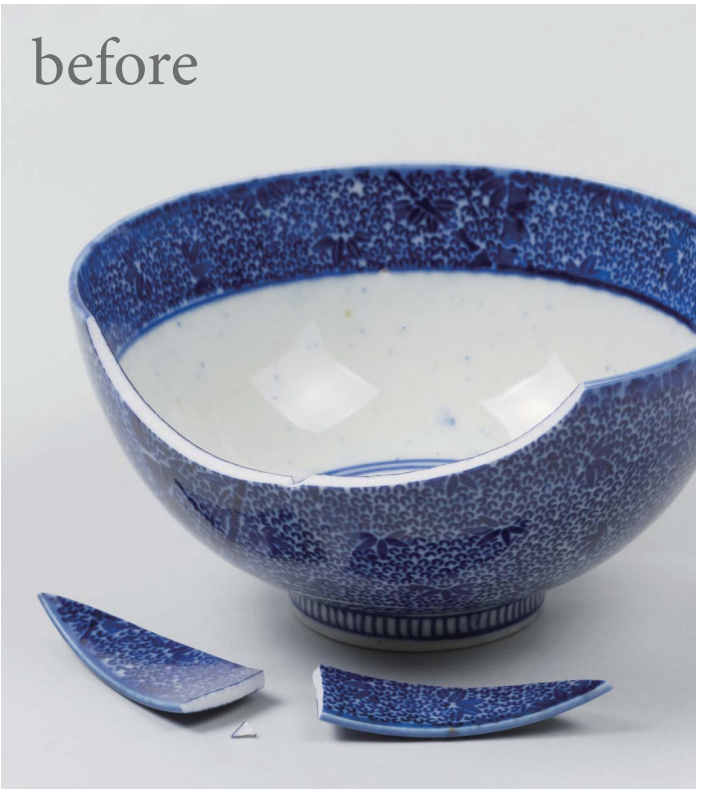
The flow of LESSON 21 Approximately 1½ months to complete repairs

1	Temporarily assemble with masking tape, then glue together	Outside 2-4 Weeks
2	Shave excess hardened urushi	
	Harden with diluted ki-urushi	Muro 2-4 Weeks
	Apply sabi-urushi to cracks	Outside 2-3 Days
3	Apply base coat glass-specific urushi (kuroroiro-urushi + ki-urushi)~nakanuri	Muro 30 Mins ➡ Outside 1-2 Days
4	Paint the e-urushi coat for funmaki	Outside 15-60 Minutes
5	Funmaki: Sprinkle gold marufun #5 and #3	Muro 1-2 Days
6	Fungatame (ki-urushi)	Muro 2-3 Days
	Shave, sand and polish	

※ Outside = Outside of the muro Muro = Place in the muro

Vessel DATE

Name: Sometsuke rice bowl
Base material: Pottery
Glaze condition: Glaze is intact and smooth
Size: 4½″ (11.5cm)
Opening: 2⅜″ (6cm) height
Damage: Three fragments, including a small one + crack



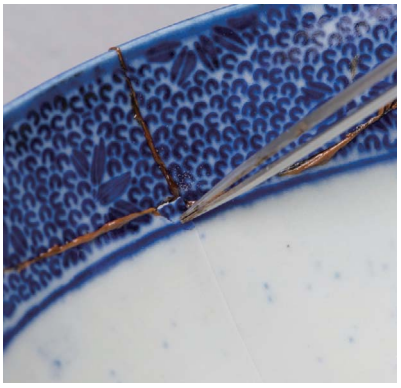
STEP ❶
Assemble temporarily then glue together

1 For more complicated breaks, start by temporarily assembling the pieces to determine if any sections are missing.

2 For this bowl, the small piece will be inserted with tweezers after the bigger pieces have been assembled. Depending on the shape of the fragments, it may make sense to start with smaller pieces first.

3 Roughen the fragment edges so that the mugi-urushi will adhere better. Then file the edges.

4 Wipe the fragment edges with benzene, then apply mugi-urushi. Wait approximately 30 minutes to an hour before attaching the pieces together.



5 Start by attaching the bigger pieces, then gently insert the smallest piece with tweezers. Do not force the small piece into the space as it may shift the bigger pieces.

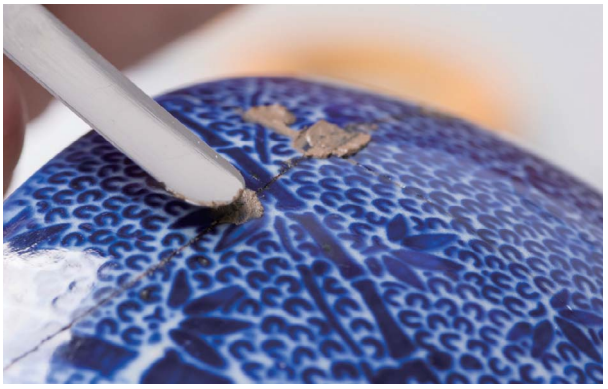
6 Firmly hold the pieces together with your hands and check the alignment from various angels.

7 Place with the bowl tilted (do not place it in the muro and leave it out for over 2 weeks. You can be sure that the mugi-urushi will be fully cured in about a month).

STEP ❷
Shave excess hardened urushi ~ sabi-tsuke

8 Remove all excess hardened urushi with a blade.

9 Apply diluted ki-urushi into the glued sections. Do the same for any cracks.
※ Refer to Lesson 18 regarding cracks



10 Apply sabi-urushi to the glued sections. Touch up with a cotton swab and let sit for 2 to 3 days.

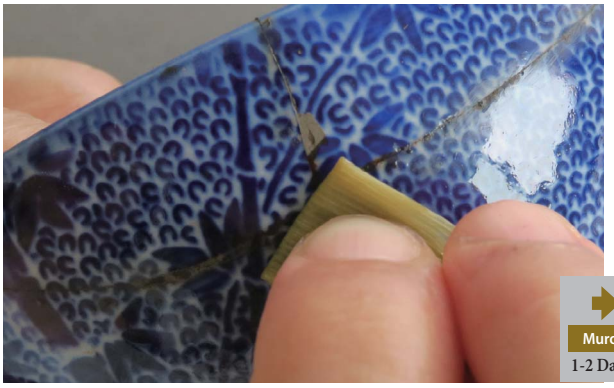
Helpful Pointers

No need to use masking tape for glazed vessels

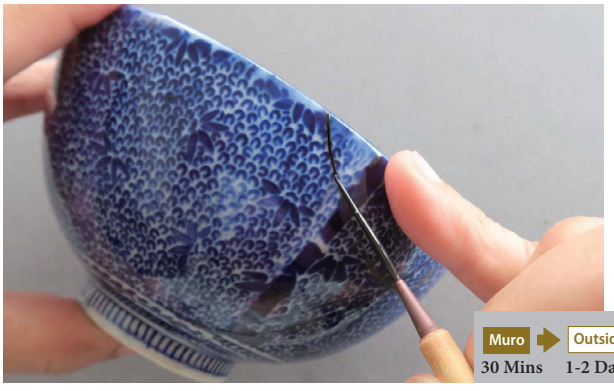
Urushi will wipe off easily from glazed porcelain, so there is no need to use masking tape to protect the surfaces from accidental spills and smears. On the other hand, urushi will stick to most pottery, even if it is glazed, so make sure to use masking tape.

STEP 3
Base coat glass-specific urushi with kurororiro-urushi + glass-specific urushi ~ nakanuri

11 Shave the hardened sabi-urushi carefully with the tip of a blade. Wipe with a tissue, gently pressing to remove the shavings.

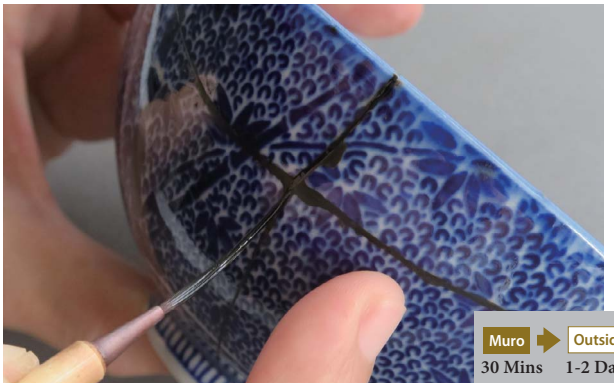


12 Sand with a wet tokusa, then wipe off with a cloth. Harden the sabi-urushi sections with diluted ki-urushi. For the final curing, place in the muro for 1 to 2 days.



13 Paint a base coat glass-specific urushi with a mixture of kurororiro-urushi and glass-specific urushi. Paint the inside first, then the outside. Place upside down and wait for the urushi to harden.

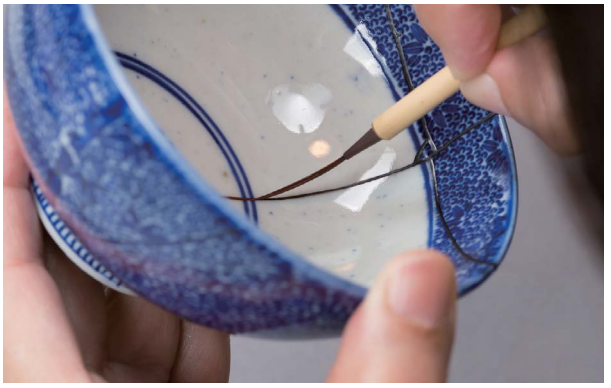
14 Wrap a piece of microfinishing film (superfine) around an eraser and lightly sand. Wipe off with a tissue.



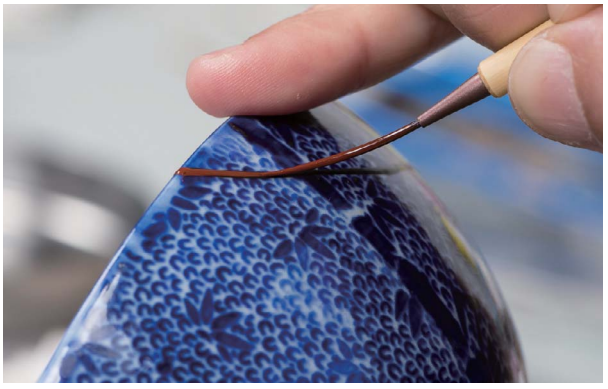
15 Paint the nakanuri layer with kurororiro-urushi. Once the urushi has cured, mending is complete.

STEP 4
Paint the e-urushi coat for funmaki

16 Sand with the microfinishing film (superfine). Wipe with benzene.



17 To prepare for the gold powder sprinkling, start by painting the inside of the vessel with the strained e-urushi mixture.



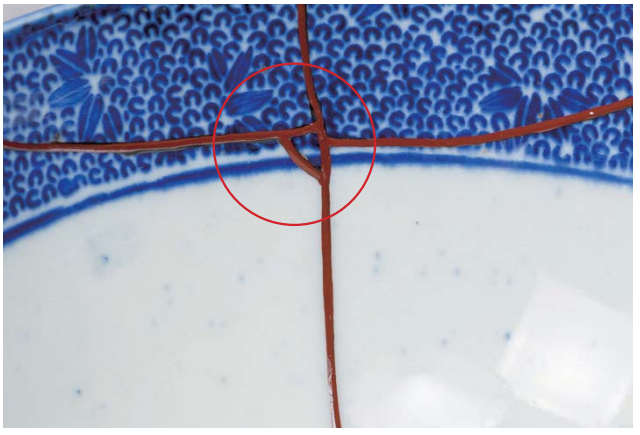
18 Next, paint the exterior.

19 The e-urushi layer has been painted. Wait for the ideal time to sprinkle the gold powder.

Helpful Pointers

Don't forget to paint around the small fragments too

For this bowl, the smallest fragment was available. Even though the piece is tiny, make sure to paint the e-urushi outline around this piece as well.



STEP 5
Funmaki: sprinkle the gold marufun #5 and #3

20 Use a fundzutsu to sprinkle the gold powder (marufun #5).

21 Generously sprinkle over the painted e-urushi line.

22 Now sprinkle the powder on the exterior as well. Use a harai kebo to collect all the loose marufun #5 gold powder.

TIP Embed the powder

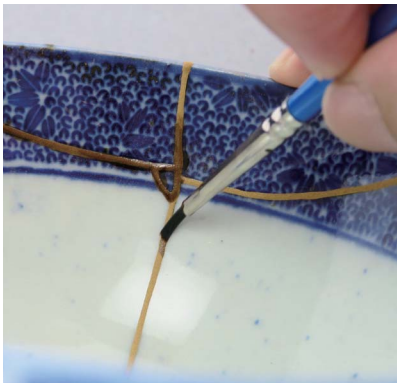
23 With the harai kebo, embed the marufun #3 gold powder into the existing layer.

24 The sprinkling of gold powder is complete.

Muro
1-2 Days

25 The inside of the bowl.

STEP 6
Fungatame (ki-urushi) ~ polish

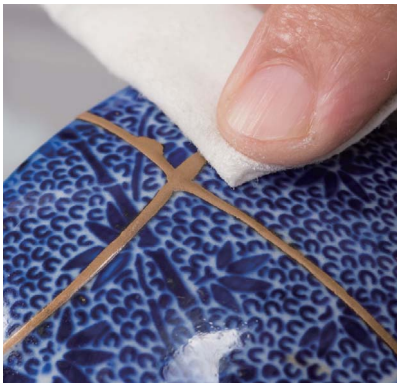


26 Proceed with fungatame about 1 to 2 days after funmaki. With the tip of a paintbrush, let the ki-urushi soak into the gold powder layer.

27 Use a clean tissue to soak up extra urushi. Repeat about 3 times until all the urushi has been soaked up.

28 Lightly sand with a piece of micro-finishing film (fine). Take care not to damage the gold powder layer.

29 Apply a thin layer of cooking oil to the repaired area, then add a little bit of migakiko (powder abrasive) and polish.



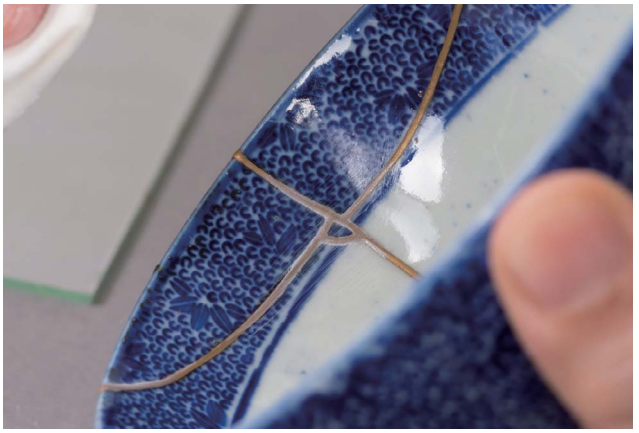
30 Keep polishing with the tissue to a high shine.

31 Complete. Wait about 2 weeks before using the repaired vessel.

Helpful Pointers

Do not use too much migakiko (powder abrasive) to polish

If you use too much migakiko while polishing, the gold powder layer will turn white. Use a very small amount with tissue.



Lesson 22

Pottery Fragments (Part 1) Iron Glaze Mortar

File the Edges When a Fragment Does Not Fit Well

Urushi will adhere to pottery without sanding

For broken pottery fragments, the first step is to file and prepare the surfaces. However, compared to porcelain most pottery is prone to crumbling, so take care when shaving, sanding and filing. On the flip side, pottery absorbs urushi better than porcelain, so there is no need to roughen the surfaces.

After you have assembled all the pieces with mugi-urushi and shaved any excess urushi, you may discover that there are some chipped areas. Use sabi-urushi instead of mugi-urushi to fill the chipped areas. Make sure to protect other parts of the vessel with masking tape when applying sabi-urushi.

The flow of LESSON 22

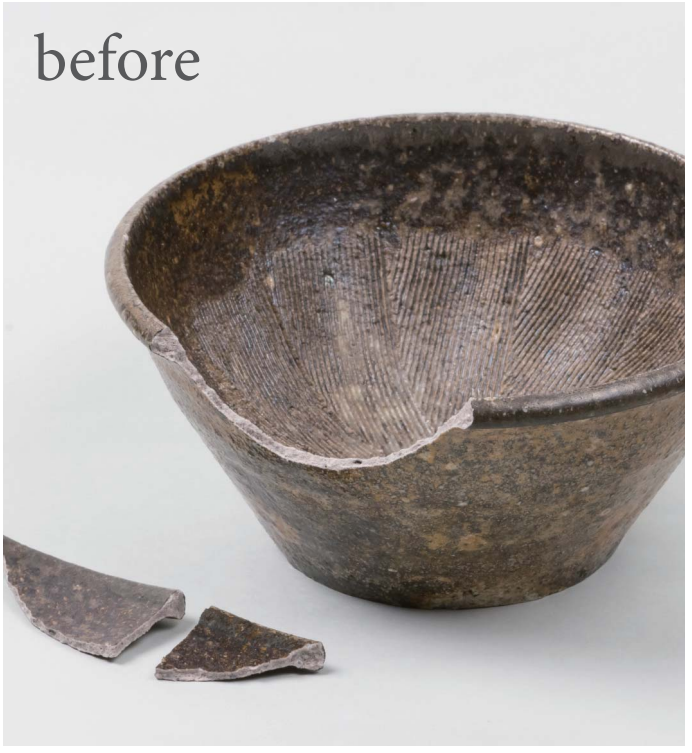
Approximately 2 months to complete repairs

1	Prepare the fragment pieces and apply mugi-urushi	Outside 30-60 Minutes
2	Glue together ~ shave excess hardened urushi	Outside 2-4 Weeks
	Harden with diluted ki-urushi	Muro 1 Week
	Fill chips with sabi-urushi	Outside 2-3 Days
3	Apply base coat glass-specific urushi (kuroroiro-iurushi + glass-specific urushi)	Muro 30 Mins ➡ Outside 1-2 Days
4	Paint the nakanuri layer with kuroroiro-urushi	
5	Paint the e-urushi coat for funmaki	Outside 15-60 Minutes
6	Funmaki: Sprinkle gold keshifun with the harai kebo	Outside 1 Day ➡ Muro 3-4 Days

※ Outside = Outside of the muro Muro = Place in the muro

Vessel DATE

Name: Iron glaze mortar
Base material: Pottery
Glaze condition: Although the glaze is intact, the texture is coarse and uneven.
Size: 6¾″ (17cm)
Opening: 3⅛″ (8cm) height
Damage: Two fragments, small chips



STEP ❶
Prepare the fragment pieces, apply mugi-urushi ~ assemble

1 First, check to see if the fragments fit together.

2 If the pieces do not fit, file the edges to adjust the shapes. Use 400 grit waterproof sandpaper.

3 Roughen the fragment edges with a diamond bit.

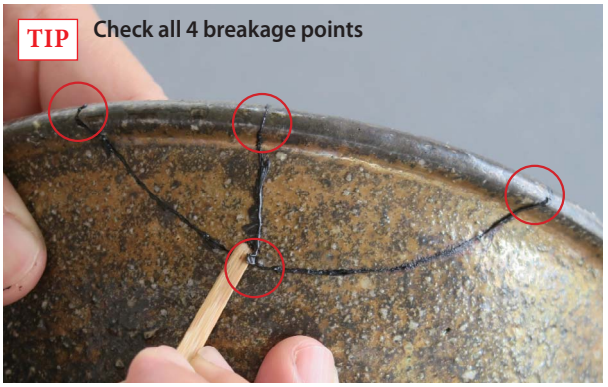
4 Pottery can crumble easily, so be careful when filing and sanding. Use a light touch.

5 Once the fragments have been prepared, wipe down the edges.

6 When the fragments have dried, apply the mugi-urushi. Wait about 30 minutes to an hour before attaching the pieces together.

7 Firmly attach the pieces together. Shave off any excess mugi-urushi along the rim and double-check that the pieces are aligned.

STEP ❷
Shave excess hardened urushi ~ sabi-tsuke



8 For complicated breaks, check the alignment for all the main breakage points along the rim and where the pieces converge together.

9 Here we can see that there are chipped areas as we check for alignment. Remove the mugi-urushi in the chipped area. Mugi-urushi is not ideal as a filler, so sabi-urushi will be used instead.

10 Once the urushi glue has completely hardened, shave off any excess spilling out of the edges.

11 Soak the mended seams with diluted ki-urushi. Use a cotton swab to wipe off any excess urushi, taking care not to smear the urushi. Then place in the muro.

12 Attach masking tape for protection and apply sabi-urushi.

13 Once sabi-tsuke (the application of sabi-urushi) is complete, slowly peel off the masking tape. Wait 2 to 3 days before placing the vessel in the muro.

STEP 3
Apply base coat glass-specific urushi with kuroroiro-urushi + glass-specific urushi

14 The excess urushi that has hardened.

15 Shave the sabi-urushi with a blade. Use the tip of the blade to avoid damaging the surface.

16 Next, sand with the tokusa and press a cloth to wipe off any residue. Harden the sabi-urushi with diluted ki-urushi. For the final curing, place in the muro for 1 to 2 days.

17 Apply a base coat glass-specific urushi with a mixture of kuroroiro-urushi and glass-specific urushi.

18 Because the surface on the inside is uneven, make sure there are no missed spots.

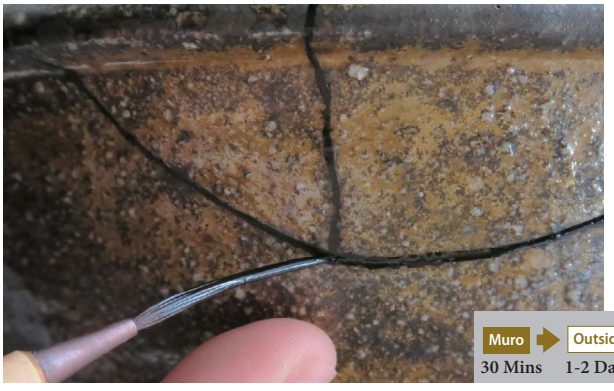
19 Due to the unevenness of the surface, an additional kuroroiro-urushi layer (nakanuri) will be necessary.

STEP 4
Apply the nakanuri layer with kurororiro-urushi

20 Lightly sand with a piece of microfinishing film (superfine) wrapped around an eraser. Press the area with a cloth after sanding.

21 Apply the nakanuri layer with kurororiro-urushi.

22 Be careful not to miss any spots.



23 Once the urushi has hardened and cured, the mending is complete. If your aim is for the black lacquer finish, the vessel is done.

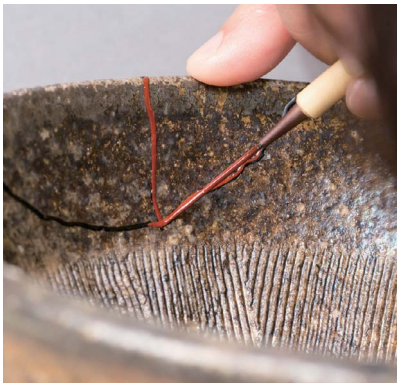
Helpful Pointers

After gluing the pieces together, cure with diluted ki-urushi

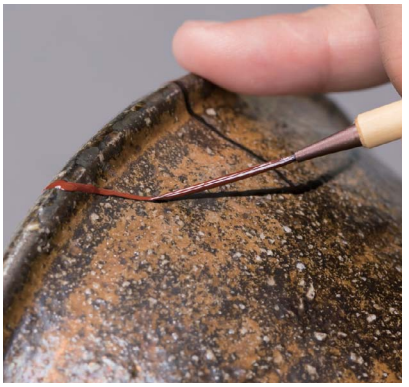
"After it was repaired, water leaked out." To avoid this situation, once the mugi-urushi glue has dried, cure the mended areas with diluted ki-urushi. Follow the same steps for repairing cracks. To ensure that all spaces are filled, apply the ki-urushi a couple of times.

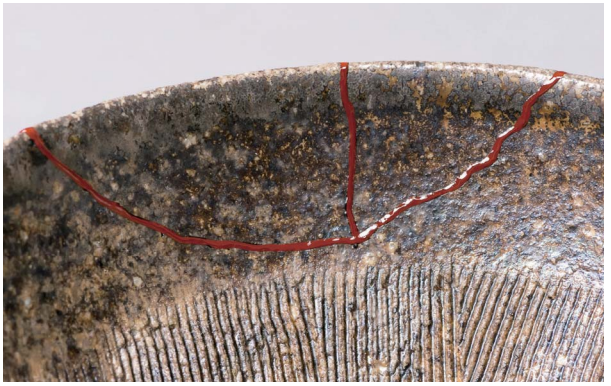
STEP 5
Paint the e-urushi coat for funmaki

24 Sand with microfinishing film (superfine). Wipe with benzene after sanding.



25 To prepare for the sprinkling of gold powder, strain the e-urushi mixture and paint a layer starting on the inside and then on the outside.





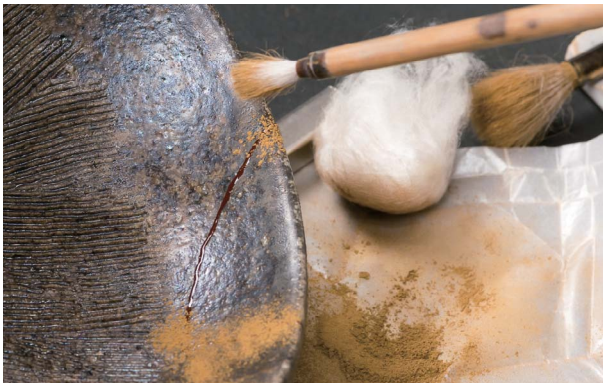
26 E-rushi has been applied. Place the vessel upside down and wait for the ideal time to sprinkle the powder.

Helpful Pointers

Do not use mawata to polish the inside of the mortar

After sprinkling the gold powder inside of the mortar, polishing with a mawata will trap the powder into the grooves. Instead, use a harai kebo to carefully polish the grooved section.

STEP 6
Funmaki: Sprinkle the gold keshifun with a harai kebo



27 Sprinkle the gold powder (keshifun) with a harai kebo.

28 Spread the gold powder on top of the painted urushi layer with a sweeping motion.

29 Sprinkle the gold powder on the outside as well.

30 Rotate the mawata to gently polish and set the gold powder. The mawata will easily snag on unglazed or bumpy surfaces, so compress the mawata into a small ball as you sprinkle the powder.

31 The gold powder has been applied.

32 Complete. Leave out for a day, then place in the muro for 3 to 4 days to fully cure. Wait about 2 weeks before using the repaired vessel.

Lesson 22

Mending Without Urushi

If Food Safety Isn't a Concern, a Synthetic Adhesive May be Used

The mending method will differ depending on the type of breakage/damage.

This book introduces the appeal of taking your time to mend broken things into something even more beautiful. The added benefit of urushi is its non-toxicity, making it a safe option with which to repair tableware. However, when food safety isn't an issue, a synthetic adhesive may be utilized.

Kintsugi is an honored Japanese tradition and is distinct from the concept of "restoration" which focuses on hiding any damage and is a more western concept.

The donkey ornament in the photo was missing an ear, and saddened by its one-eared state, the owner requested a repair "no matter what the replacement ear looks like." A simulacrum of the original ear was created out of ceramic, painted to match the ornament and attached. The monkey incense holder and deer-shaped bell are gifts from a half-century ago filled with familial memories. Because they are near and dear to the heart, broken as they are they cannot be thrown away.

I often receive requests to mend these types of invaluable, meaningful items and it pains me to have to say I can fix some but not others. Because I want to repair as many things as possible, I dedicate my every day to practice my skills.

PART 5

Complex Repairs

Lesson 23

Large Chips Oribe-style Glazed Small Bowl

Fill Large Chips with Strong Kokuso-urushi Putty

Strengthen the urushi with the fibers of kokuso

Larger chips along the rim are more difficult to repair compared to small chips. First, a filling made out of kokuso-urushi putty will need to be added. Kokuso-urushi is a putty formed by mixing nori-urushi (glue urushi) with kinoko sawdust and hemp fiber. The putty is extra strong due to the fiber and is effective for filling big chips. After filling the chipped area with the putty, proceed with the same steps used for mending smaller chips: sabi-tsuke and sabi-kezuri (shaving the sabi-urushi).

For the final phase, sprinkle silver powder and polish.

The flow of LESSON 23

Approximately 2 months to complete repairs

1	Fill with kokuso-urushi putty	Outside 1-2 Weeks
	Shave excess kokuso-urushi	
2	Apply the second round of kokuso-urushi	Outside 1-2 Weeks
3	Sabi-tsuke: apply sabi-urushi	
	Sabi-kezuri ~ 2nd sabi-tsuke Repeat until the surface is smooth and even	Outside 2-3 Days
4	Base coat glass-specific urushi with kuroroiro-urushi ~ nakanuri	Muro 30 Mins ➡ Outside 1-2 Days
5	Prepare for funmaki: Paint a layer of kuroroiro-urushi + ki-urushi	Outside 15-60 Minutes
6	Fummaki: sprinkle silver marufun #5 and #3	Muro 1-2 Days
	Fungatame (kuroroiro-urushi + ki-urushi)	Muro 2-3 Days
	Shave, sand and polish	

※ Outside = Outside of the muro Muro = Place in the muro

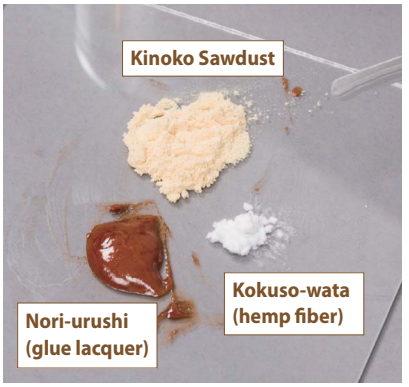
Vessel DATE

Name: Oribe-style glazed small bowl
Base material: Pottery
Glaze condition: Glaze is intact and smooth
Size: 3⅛ x 3½″ (8 × 9cm)
Opening: 2″ (5cm) height
Damage: Large chip

STEP ❶
Make the filling out of kokuso-urushi putty

1 Wipe down the chipped area with benzene and soak with diluted ki-urushi. Place in the muro for 30 minutes.

2 Mix equal parts ki-urushi and nori paste (glue) to make the nori-urushi.



3 Mix in kinoko sawdust and a little bit of kokuso-wata into the nori-urushi to make kokuso-urushi.

4 Blend until the mixture no longer sticks to the hera.

5 Use a bamboo hera to thoroughly fill the ridged surface with the kokuso-urushi.

6 Cover with plastic wrap and shape the filling with a flexible hera.

7 Fold the plastic wrap inward and continue shaping the filling along the rim. After the filling has been shaped, slowly peel the plastic wrap without removing the filling.

8 Wait about 1 week during the summer and 2 weeks in the winter before placing in the muro. Kokuso-urushi will shrink as it cures so monitor the filling every day.

STEP ❷
Apply the second round of kokuso-urushi

9 Shave any excess kokuso-urushi with a blade and then carefully sand with 600 grit waterproof sandpaper.

10 Harden with diluted ki-urushi and place in the muro for 1 day.

11 Add more kokuso-urushi (2nd time). Since the foundational filling has already been built, this step will be easier.

12 Cover with plastic wrap and press down to release air. Carefully peel off the plastic wrap to avoid removing the filling. Allow to dry and cure for 1 to 2 weeks.

13 Shave excess kokuso-urushi with a blade and sand with waterproof sandpaper. Press with a cloth to clean, then harden with diluted ki-urushi and wait one day.

Helpful Pointers

Maintain the integrity of the vessel's shape

Once the chipped area has been filled with kokuso-urushi, it will need to be shaved with a blade, then sanded with waterproof sandpaper. Make sure to follow the vessel's rim shape as you shave and sand. After this step is complete, sabi-urushi will be applied.

STEP 3
Apply sabi-urushi on the filling

14 The first sabi-tsuke. Refer to the photo to get a sense of how much sabi-urushi to use.

15 Spread to cover the filling with a hera.

16 Monitor the shape of the filling from above as you shave the sabi-urushi. Press a cloth to remove any residue.

17 After shaving with the blade, use a tokusa to carefully sand the area. Soak with diluted ki-urushi.

18 The second sabi-tsuke.

19 More sabi-kezuri. Press with a cloth to remove any residue and harden with diluted ki-urushi. Place in the muro for 1 to 2 days for the final curing.

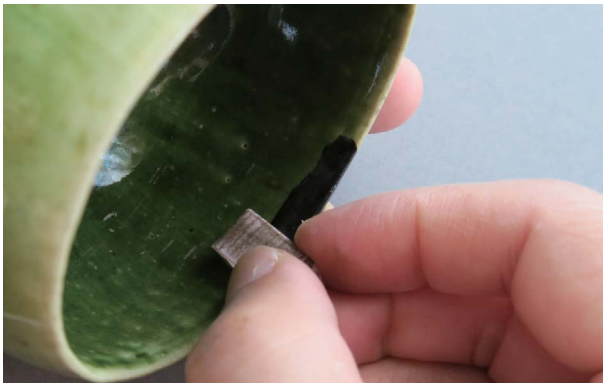
Helpful Pointers

Hold with your non-dominant hand as you sand

When you have shaped the sabi-urushi to your liking, sand the surface with the tokusa. If you add too much pressure while sanding, the entire filling may fall out, so gently hold down with the non-dominant hand as you use the tokusa.

STEP 4
Base coat glass-specific urushi with kurororiro-urushi ~ nakanuri

20 Apply a base coat with kurororiro-urushi. Paint an outline with a thin brush first, then use a flat brush to fill the outline.



21 Wrap a piece of microfinishing film (superfine) around an eraser and sand down the area to remove any bumps.

22 When the surface is smooth, press with a cloth to remove any residue.

23 Paint the nakanuri layer with kurororiro-urushi.

STEP 5
Prepare for funmaki: Paint a layer of kurororiro-urushi + ki-urushi

24 To prepare for the silver powder sprinkling, start by painting the inside of the vessel with the strained kurororiro-urushi and ki-urushi mixture.

25 Next, paint the exterior.

26 Fill in the shape with a flat brush.

27 The strained kurororiro-urushi + ki-urushi has been painted. Wait for the ideal time to sprinkle the silver powder.

Helpful Pointers

Remove any dust or debris with tweezers

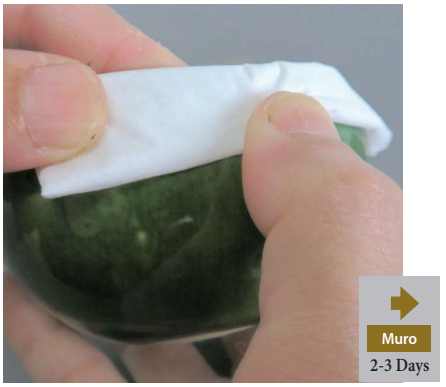
If any debris or dust sticks to the surface while you are applying the urushi, don't worry and simply use tweezers to pluck them off. Do not use your fingertips, which will damage the painted layer and dirty your hands. Never touch urushi directly with your hands.

STEP 6
Funmaki: Sprinkle silver marufun #5 and #3 ~ polish

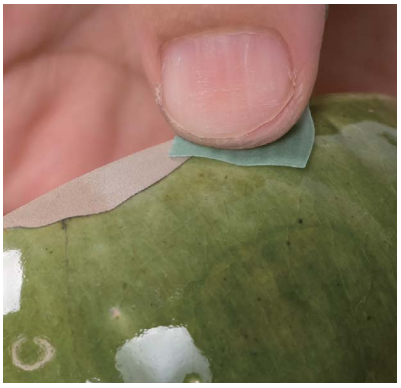
28 Sprinkle silver powder (marufun #5) with a fundzutsu. Use a harai kebo to gently spread the powder on top of the urushi, then collect the loose powder.

29 Sprinkle the silver powder (marufun #3) with a harai kebo.

30 Proceed with fungatame 1 to 2 days after sprinkling the silver powder. Mix kuroroiro-urushi and ki-urushi and use the tip of a brush to let the mixture soak into the silver powder layer.



31 Press with a tissue about 3 times, making sure to apply the clean part of the tissue each time until no urushi is soaked up.



32 Lightly sand with a piece of microfinishing film (fine). Take care not to damage the gold powder layer.

33 Use the taiki to gently polish the surface some more. Alternatively, use amor for the polishing step.

34 Apply a thin layer of cooking oil to the repaired area, then add a little bit of migakiko (powder abrasive) and polish. Keep polishing with the tissue to a high shine, and now the project is done.

Lesson 24

Complex Repairs: White Mug

Use Hemp Thread to Reinforce a Mended Handle

Apply kokuso-urushi on the wrapped thread to strengthen the repair

Handles break easily due to their thin and delicate structure. Mugi-urushi glue alone may not be effective enough, so this type of repair is reinforced in various ways.

Reinforcement methods include wrapping hemp thread and fastening staples. In this section, we will introduce reinforcement techniques that do not require specialized tools or materials. Take the time and care to make the handle repair as durable as possible.

The flow of LESSON 24 Approximately 2 months to complete repairs

1	Attach handle with mugi-urushi	Outside 2-4 Weeks
2	Shave excess mugi-urushi and prepare to wrap hemp thread	Muro 1 Week
3	Apply mugi-urushi on mended areas, wrap hemp thread	Outside 1-2 Weeks
4	Harden the hemp thread with ki-urushi	Muro 2-3 Days
	Apply kokuso-urushi putty	Outside 1 Week
5	Sabi-tsuke ~ Sabi-kezuri (twice)	Outside 2-3 Days
	Base coat glass-specific urushi with kuro-roiro-urushi (mix in glass-specific urushi)	Muro 30 Mins ➡ Outside 1-2 Days
6	Prepare for funmaki: Paint a layer of kuroroiro-urushi + ki-urushi	Outside 15-60 Minutes
	Funmaki: Sprinkle silver marufun #5 and #3	Muro 1-2 Days
	Fungatame (kuroroiro-urushi + ki-urushi)	Muro 2-3 Days
	Shave, sand and polish	

※ Outside = Outside of the muro Muro = Place in the muro

Vessel DATE

Name: White mug
Base material: Pottery
Glaze condition: Glaze is intact and smooth
Size: 3⅜″ (8.5cm)
Opening: 4¾″ (12cm) height (including handle) 4″ (10cm) (not including handle)
Damage: Broken handle

STEP ❶
Attach handle with mugi-urushi

1 Wipe the damaged areas with benzene and apply mugi-urushi to the handle's broken edges. Apply mugi-urushi to the mug's damaged area as well. Wait to attach the pieces for 30 minutes to an hour.

2 Attach the handle. Be careful not to press too hard.

3 Wait until the mugi-urushi starts to harden (usually the next day during the summer, and about 2 to 3 days during the winter months).

4 When the mugi-urushi starts to harden, remove the excess glue with a hera and check the alignment.

5 If the pieces are aligned, press firmly with both hands to secure the handle. Note that if the mugi-urushi has not hardened enough, the pieces will slide around when you apply pressure.

Helpful Pointers

Check the alignment from every angle

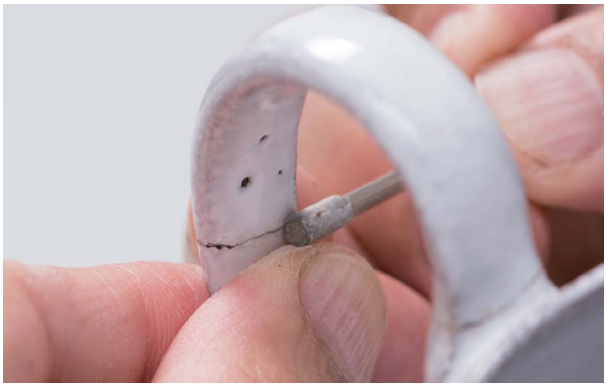
Once the handle has been attached, confirm that the pieces are aligned from every angle. To prevent gravity from shifting the attached handle, position the mug at an angle that is nearly parallel to the floor while the mugi-urushi cures.

STEP ❷
Shave the excess urushi, prepare to wrap the hemp thread

6 Use a blade to shave off any excess urushi.

7 The shavings may accumulate in the narrow sections, so use a brush to sweep off the debris as you shave the urushi. Then soak the mended area with diluted ki-urushi to harden.

8 Prepare for the thread reinforcement. Roughen the surface with a diamond bit to provide better adhesion. Make sure to contain the diamond bit application to the area that will be wrapped with thread.



9 Roughen the underside as well. If you apply too much pressure, the handle will break off along the mended area so be careful.

10 Wipe clean with benzene and apply diluted ki-urushi on the rough edges. The diluted ki-urushi strengthens the adhesiveness of mugi-urushi.

11 Press with a tissue to soak up the extra ki-urushi.

STEP 3
Apply mugi-urushi on mended areas, wrap hemp thread

12 Since the hemp thread is too thick as is, separate the strands and use the unwaxed strands from the center. Cut a length of about 12″ (30cm).

13 Apply mugi-urushi where the hemp thread will be wrapped. Make sure to apply enough for the thread to stick.

14 Add masking tape to protect the mug.

15 Wrap the hemp thread around the mugi-urushi section. Leaving a tail, cut the thread.

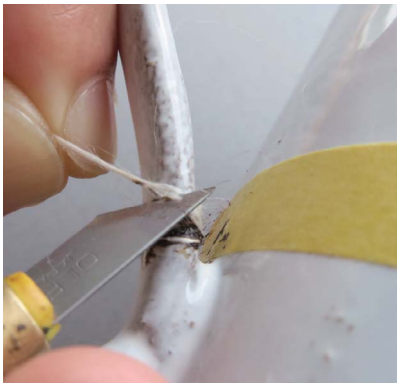
16 Use tweezers to wrap the thread at the top of the handle, where it can be challenging to keep the threads even.

17 Cover the hemp thread with plastic wrap and press to attach the pieces.

18 In the sections where your fingers will not fit, use a tool like a hera to attach the plastic wrap.

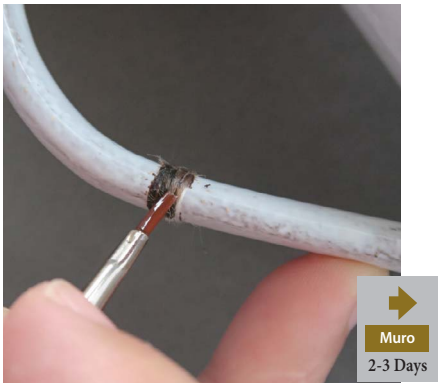
19 Once the hemp thread has been wrapped, fill any small chips with sabi-urushi. Wait 1 to 2 weeks for the mugi-urushi to cure.

STEP 4
Harden the hemp thread with ki-urushi ~ apply kokuso-urushi putty



20 Trim the excess hemp thread close to the wrapped section.

21 Shave any extra hardened mugi-urushi with a blade.

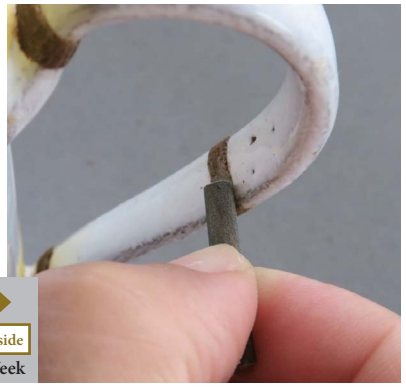


22 Soak with diluted ki-urushi. Place in the muro for 2 to 3 days to cure.

23 Sand and smooth out the uneven parts of the wrapped hemp thread with waterproof sandpaper.

24 Apply plenty of kokuso-urushi on the wrapped sections, filling in the areas between the threads. Any excess kokuso-urushi can be shaved later.

25 Press plastic wrap on top. Wait 1 week to cure the urushi.



26 Shave excess kokuso-urushi with a blade, then sand with sandpaper. Press with a cloth to clean.

27 Soak in diluted ki-urushi. Wipe off any extra urushi with a tissue.

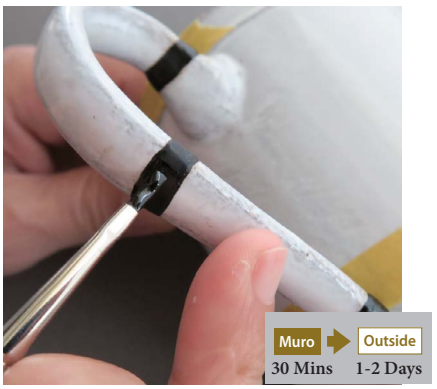
STEP 5
Sabi-tsuke – sabi-kezuri (twice) ~ base coat glass-specific urushi

28 For the finishing step, apply sabi-urushi on top of the kokuso-urushi. Then shave the sabi-urushi. Repeat the sabi-tsuke and sabi-kezuri. Leave out of the muro for 2 to 3 days.

29 The second sabi-kezuri is done and the diluted ki-urushi has cured.

30 Paint the kuroroiro-urushi base coat glass-specific urushi.

31 Polish with a piece of microfinishing film (superfine). If your finger does not fit in certain parts, stretch the microfinishing film across the area to polish.



32 Paint the nakanuri layer with kuroroiro-urushi. When the urushi has cured, the mending is complete.

Helpful Pointers

Sabi-tsuke on top of the kokuso-urushi

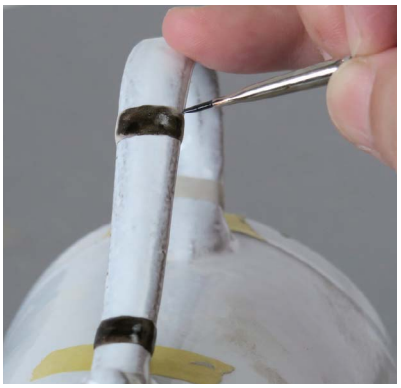
Due the fibers in the kokuso-urushi, the bumpy texture shows through the kuro-roiro-urushi layers. Because sabi-urushi yields a smoother finish, it is applied on top of the hardened kokuro-urushi.

STEP 6
Prepare for funmaki: Paint a layer of kurororiro-urushi + ki-urushi ~ polish

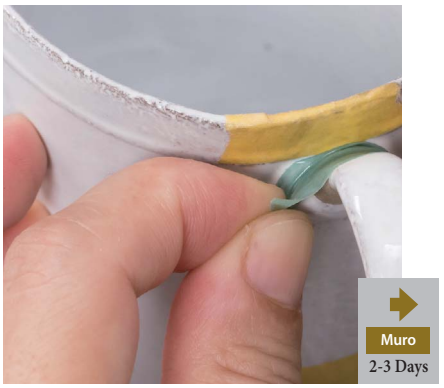
33 Paint the strained kurororiro-urushi + ki-urushi mixture with a flat brush. Move the brush a little at a time to paint the hard-to-reach areas on the underside of the handle.

34 Use a fundzutsu to sprinkle the silver powder (marufun #5). Collect all the loose powder when the sprinkling is done.

35 Sprinkle the silver powder (marufun #3) with a harai kebo, and the funmaki is complete.



36 Proceed to fungatame. Paint with a mixture of kurororiro-urushi with ki-urushi (1:1 ratio). Press with a tissue when you have finished painting.



37 Polish with a piece of microfinishing film (fine). For areas that are hard to reach with your fingers, insert the microfinishing film into the tight spaces.

38 Polish with a taiki. Make sure not to apply too much pressure. At this point, the project can be considered complete. Or, you can polish some more with amor.

39 For an even glossier finish, mix cooking oil with a little bit of migakiko and use your finger to polish the surface with the mixture.

40 Polish with a tissue, then give it a final wipe. Wait about 2 weeks before using.

Lesson 25

Complex Repairs: White Kohiki Pot with Handle

Be Careful of Urushi Diffusion on Earthenware

Beware of urushi diffusion with pottery made out of coarser material

Kohiki pottery is made of coarse red clay covered with white slip. A transparent glaze is then applied to the vessel and fired. Although popular for its organic texture, one of the drawbacks of kohiki is how easily the glaze peels off. To accommodate this, diluted white urushi is used to harden the surface before applying the mugi-urushi glue. The benefit of the white urushi application is twofold: it prevents the black urushi from seeping in between the glaze and base material, and the mugi-urushi will not diffuse into the coarse clay. When the glue spreads out, it reduces the effectiveness. However, if white urushi is not available, there is no need to special order it. Consider any kind of urushi seepage as the addition of character and focus on thoroughly curing the surface with diluted ki-urushi.

The flow of LESSON 25

Approximately 2 months to complete repairs

1	Prepare the surface and apply mugi-urushi	Outside 30-60 Minutes
2	Attach the pieces	Outside 2-4 Weeks
3	Mask the base and apply sabi-urushi (sabi-tsuke)	Outside 2-3 Days
4	Sabi-kezuri, 2nd sabi-tsuke Repeat until the chips are filled	Outside 2-3 Days
5	Base coat glass-specific urushi with kuroroiro-urushi + glass-specific urushi ~ nakanuri	Muro 30 Mins ➡ Outside 1-2 Days
6	Prepare for funmaki: Paint e-urushi	Outside 15-60 Minutes
	Funmaki: Sprinkle gold keshifun with kebo and mawata	Outside 1 Day ➡ Muro 3-4 Days

※ Outside = Outside of the muro Muro = Place in the muro

Vessel DATE

Name: White kohiki pot with handle
Base material: Pottery
Glaze condition: Glaze is intact but is delicate due to the kohiki white slip.
Size: 3⅛″ (8cm)
Opening: 6″ (15cm) height (including handle)
2¾″ (7cm) (without handle)
Damage: Multiple, complex fragments

STEP 1
Prepare the surface and apply mugi-urushi

1 Dilute white urushi with kerosene and soak into the broken edges, which will prevent mugi-urushi or the hardening ki-urushi from seeping into the coarse base material. If white urushi is not available, feel free to omit this step.

2 Press with a tissue to soak up excess diluted white urushi.

3 Apply mugi-urushi on the broken edges. For coarser clay, make sure to completely fill in the uneven areas.

Helpful Pointers

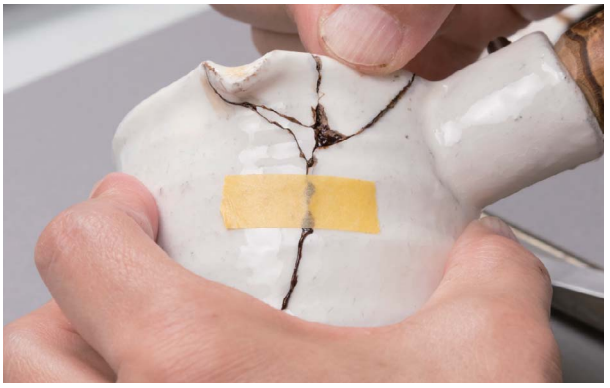
Use tape to fasten areas without mugi-urushi

When temporarily securing the fragments with tape, make sure to find sections with no protrusions of excess mugi-urushi or use a hera to remove the extra mugi-urushi to be able to fasten with tape. Otherwise, the tape may smear the mugi-urushi. If you angle the vessel to avoid the gravitational shifting of the pieces, you may not need to secure them with tape as the urushi hardens.

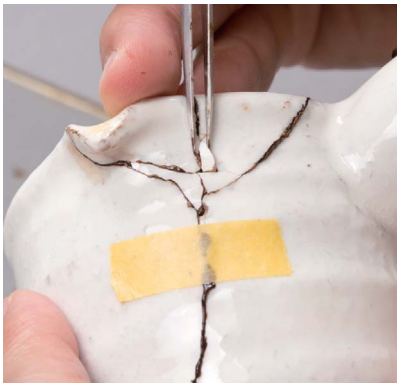
STEP ❷
Attach the pieces

4 If a small piece is difficult to fit, use tweezers to slightly move the surrounding pieces to create more space, then insert the small piece. (Mugi-urushi thickens as it hardens so do not apply it to smaller fragments.)

5 Add a little bit of mugi-urushi.



6 As you attach the pieces together with mugi-urushi, secure with tape. Press together firmly so the pieces do not shift.



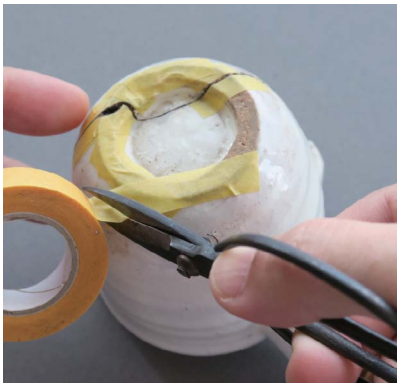
7 Do not apply mugi-urushi to smaller pieces and insert them with tweezers. (Ki-urushi will be applied later to harden them in place).

8 Once all the pieces have been inserted, press with a tissue and avoid getting any mugi-urushi on your skin.

9 Allow 2-4 weeks for the attached pieces to dry and cure.

STEP 3
Mask the base and apply sabi-urushi (sabi-tsuke)

10 Mask the base of the vessel since there is usually no glaze applied there. There is no need to mask glazed areas.



11 Attach masking tape to the base.

12 Start the sabi-tsuke along the bigger cracks. Take a small amount of sabi-urushi onto a hera and apply from the inside.

13 Apply sabi-urushi on the exterior in the same way, adding little bits of the sabi-urushi with a hera.

14 For deeper parts of the crack, apply a little bit of sabi-urushi with a hera, then use a cotton swab to push it in.

15 Don't forget to apply sabi-urushi to the cracks on the bottom.

16 Wipe off any excess sabi-urushi with a cotton swab.

STEP 4
Sabi-kezuri, 2nd sabi-tsuke

17 Shave the sabi-urushi with a blade.

18 Apply the second layer of sabi-urushi on the inside.

19 Even though the vessel is glazed, any smears will be apparent on the white surface so carefully apply the sabi-urushi.

20 Shave the excess sabi-urushi. Remove the masking tape before shaving the base area.

21 Sand the surface with a tokusa. Then soak the cracks with ki-urushi to harden.

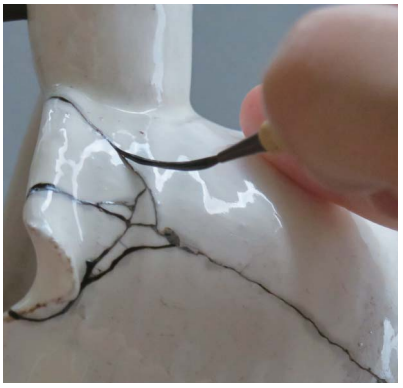
Helpful Pointers

Although masking is not necessary, take care not to stain unwanted areas with urushi

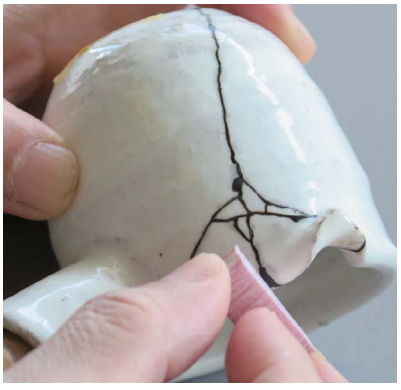
Because this vessel's glaze is intact, the only area in need of masking tape was the base. However, the white surface requires extra care during the sabi-tsuke application.

STEP 5
Base coat glass-specific urushi with kurororiro-urushi + glass-specific urushi ~ paint the nakanuri layer

22 Starting on the inside, apply a mixture of glass-specific urushi and kurororiro-urushi as a base coat glass-specific urushi.



23 Apply the base coat glass-specific urushi mixture to the exterior, including the base.



24 Wrap a piece of microfinishing film (superfine) to an eraser and sand down the uneven surface.

25 Paint the nakanuri layer with kurororiro-urushi. Paint the inside first, then the exterior.

26 The nakanuri layer is complete.

Helpful Pointers

Explore other finishes

Most people assume that kintsugi is solely about applying gold powder. However, there are a variety of finishes available including gold, silver, tin, and other colored urushi. The photo shows a finish with kijiro-urushi—a transparent urushi—painted on top of the reddish e-urushi. The lustrous red hue enhances the vessel.

STEP 6
Prepare for funmaki: paint e-urushi ~ funmaki

27 Strain the e-urushi mixture for sprinkling the gold powder. Paint a layer on the inside first, then paint the exterior.

28 Lift the e-urushi section off of the table and wait for the ideal time to sprinkle the gold powder.

29 Sprinkle the gold keshifun with a harai kebo on the inside.

30 Sweep off any excess gold powder.

31 Rotate a mawata to gently sprinkle the gold powder on the exterior.

32 Sprinkle the gold powder on the base with the harai kebo. Use a mawata to polish the gold powder layer. Then position the vessel upside down and wait 1 day. Place it in the muro for 3 to 4 days to cure the urushi.

33 Complete. Wait about 2 weeks before using the repaired vessel.

Lesson 26

Complex Repairs: Rakuyaki Matcha Bowl

Create "Blocks" of Glued Fragments when Many Pieces are Involved

Handle brittle rakuyaki with care

To repair many broken pieces, start by creating fragment blocks. Trying to attach all the pieces individually without blocking may result in shifts or mugi-urushi smears. For this example, ten broken pieces will form four blocks. These blocks will then be temporarily assembled. A few days later, the pieces can be disassembled and glued together efficiently since you will know how each piece fits together.

Generally, vessels are fired at a temperature of over 2192°F/ 1200°C. Rakuyaki, however, is often fired at a lower temperature, resulting in a softer, more brittle texture that will need to be handled with extra care.

The flow of LESSON 26

Approximately 2½ months to complete repairs

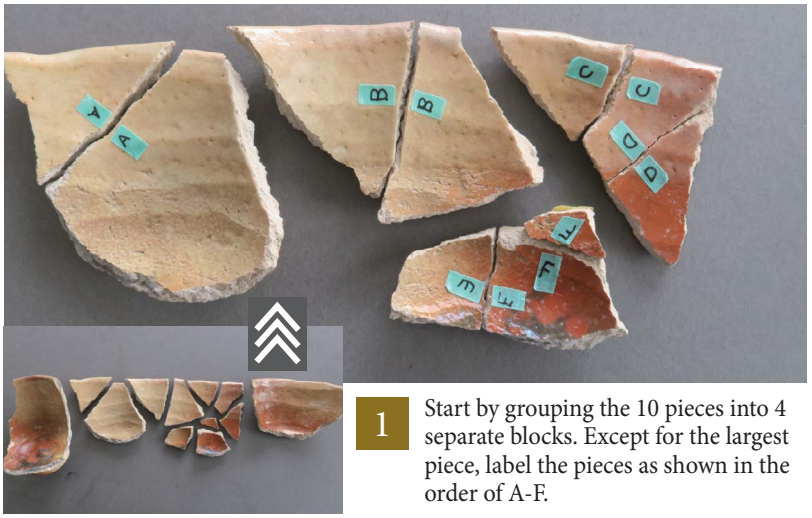
1	Group and attach broken pieces into blocks	Outside 3-4 Days
2	Use mugi-urushi to attach the pieces together	Outside 2-4 Weeks
3	Mask to protect areas and apply sabi-urushi (sabi-tsuke)	Outside 2-3 Days
4	Repeat above steps for all the pieces	
5	Base coat glass-specific urushi with kuro-roiro-urushi. Paint the nakanuri layer	Muro 30 Mins → Outside 1-2 Days
6	Prepare for funmaki with e-urushi	Outside 15-60 Minutes
	Funmaki: Sprinkle gold keshifun with harai kebo	Outside 1 Day → Muro 3-4 Days

※ Outside = Outside of the muro Muro = Place in the muro

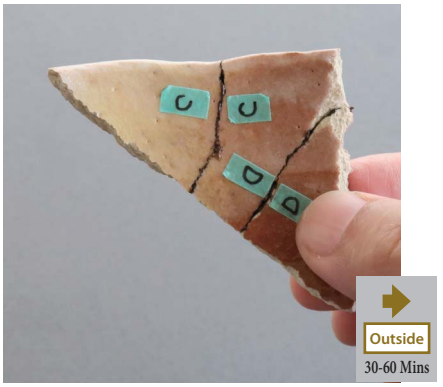
Vessel DATE

Name: Rakuyaki matcha bowl
Base material: Pottery
Glaze condition: Glaze is uneven and easily stained
Size: 4¾ x 4⅛″ (12 × 10.5cm)
Opening: 2¾″ (7cm) height
Damage: Multiple, complex fragments

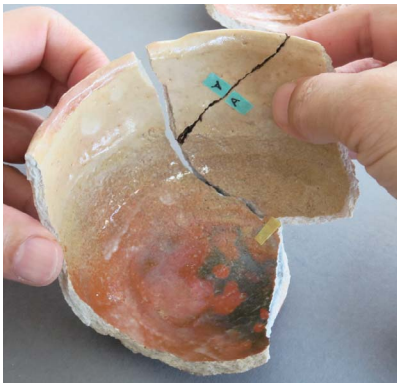
STEP 1
Group and attach broken pieces into blocks

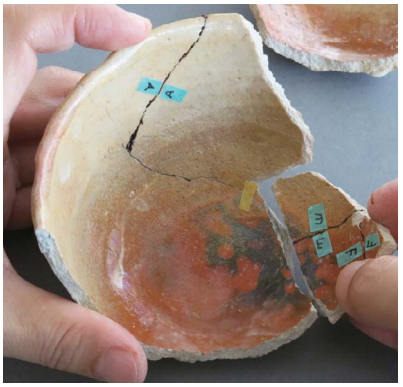


1 Start by grouping the 10 pieces into 4 separate blocks. Except for the largest piece, label the pieces as shown in the order of A-F.



2 Apply mugi-urushi to the corresponding labeled fragment edges. Wait 30 to 60 minutes, then attach the pieces together (alternatively, fasten with tape).





3 Check that the blocks will fit together with the rest of the vessel. Attempting to attach all the pieces without creating blocks first may cause the pieces to shift and will affect the composition later. While the mugi-urushi is still soft, temporarily assemble the pieces and adjust the fit as needed.

4 Attach masking tape to sections without mugi-urushi to secure the pieces for the temporary assembly.

5 To avoid getting mugi-urushi on your hands, cover the vessel with a tissue or cloth and press firmly. Do the same even if you are wearing gloves. Position the vessel in a way that will allow the mended lines to be parallel to the ground. Keep the vessel in the temporarily assembled state for 3 to 4 days.

STEP ❷
Use mugi-urushi to attach the pieces together

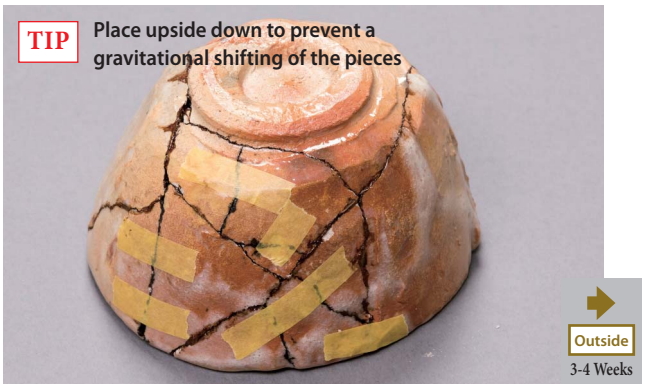
6 The mugi-urushi has fully hardened after 3 to 4 days. The pieces can still shift slightly in the glued areas and the alignment can be adjusted.

7 Remove the tape and disassemble into 6 pieces as shown. Because the mugi-urushi hasn't hardened completely, added pressure may detach the joined pieces so handle with care.

8 Figure out the order of attachment by assembling the pieces without glue first, then apply the mugi-urushi to the fragment edges.

9 Attach all the pieces. Since you will need both hands for assembly, cut pieces of masking tape in advance. Assemble one piece at a time, firmly attaching the pieces together.

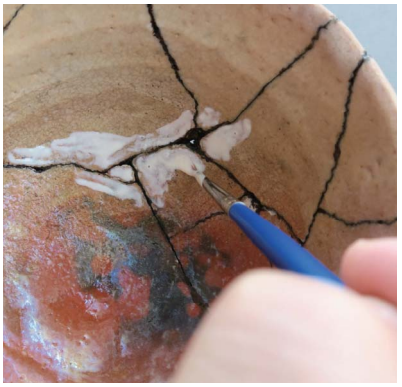
10 Cover with a tissue or cloth and press the vessel with both hands (until the pieces feel solidly attached).



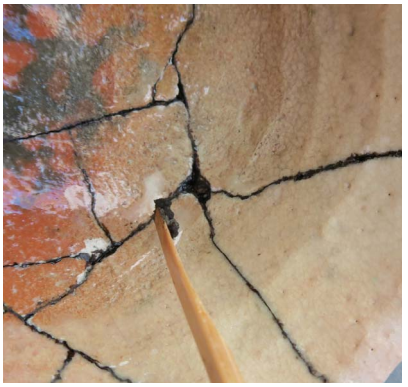
11 Make sure to check the alignment of the pieces the next day. Press to secure the pieces again. Turn the vessel upside down and allow the urushi to cure.

STEP 3
Mask to protect areas and apply sabi-urushi (sabi-tsuke)

12 To protect the unglazed base, attach masking tape.



13 Since this vessel's glaze has an uneven surface, mask with liquid rubber. Wait until it dries clear (2 to 3 minutes).



14 Take a small amount of sabi-urushi on the tip of a hera and, starting from the inside of the vessel, apply along the cracks.

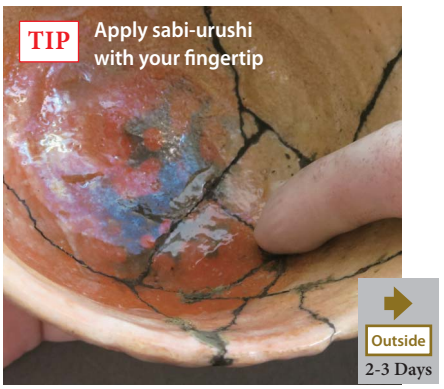
15 Push the sabi-urushi into the cracks with a cotton swab.

16 Apply sabi-urushi to the exterior of the vessel as well.

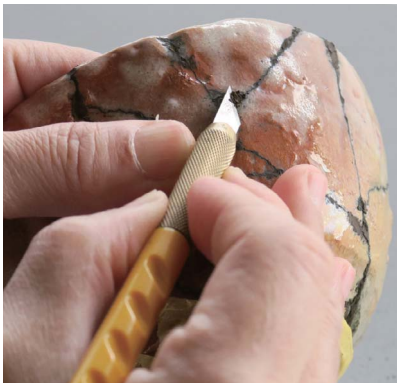
17 Once the sabi-tsuke is complete, remove the liquid rubber with tweezers. Liquid rubber comes off easily so it will need to be applied fresh for each sabi-tsuke.

18 Shave excess sabi-urushi with a blade. Rakuyaki is a soft clay, so be extra careful to avoid damaging the surface. Mask with liquid rubber and let it dry. Then harden with diluted ki-urushi.

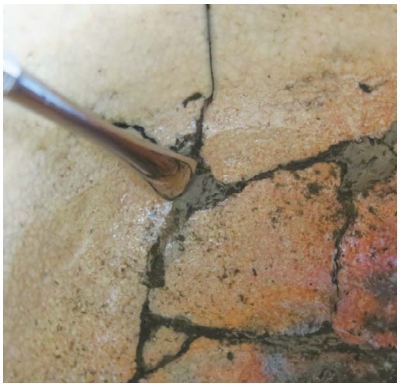
19 The second sabi-tsuke. If a section is too tight for the hera, use the tip of your gloved finger to fill the cracks. Remove the liquid rubber when sabi-tsuke is complete.



STEP 4
Repeat above steps for all the pieces



20 Shave the sabi-urushi with a blade.

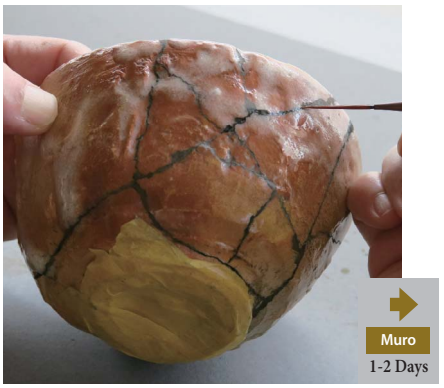


21 For deeper inner parts, choose a hera with a rounded metal tip, using a scratching motion.

22 Sand the surface with a tokusa. After sanding, soak the sabi-urushi with diluted ki-urushi.

23 The final sabi-tsuke. The goal of sabi-tsuke is to smooth out the surface, so repeat as many times as necessary to achieve this result.

24 Shave the sabi-urushi and sand with the tokusa.

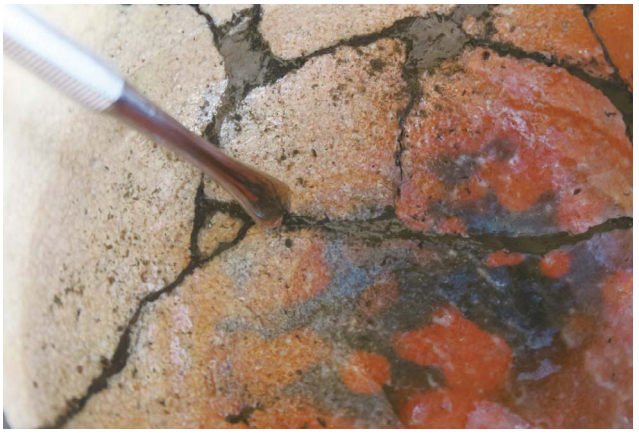


25 Fully cure by soaking with diluted ki-urushi. Pay close attention to avoid smearing the urushi onto unwanted areas of the vessel. Press with a tissue to soak up excess ki-urushi.

Helpful Pointers

For the interior of rounded vessels, use a metal hera with a scratching motion

A matcha bowl is usually deep and rounded and sabi-kezuri may be challenging for these types of vessels. To accommodate the depth and shape, use a hera with a rounded metal tip to scratch off the excess sabi-urushi.



STEP 5
Base coat glass-specific urushi with kurororiro-urushi, paint the nakanuri layer

26 Paint a kurororiro-urushi base coat glass-specific urushi on the inside first. For complex repairs, consider attaching tape to mark areas that can be touched (where no urushi has been applied).

27 Apply a base coat glass-specific urushi to the exterior as well.

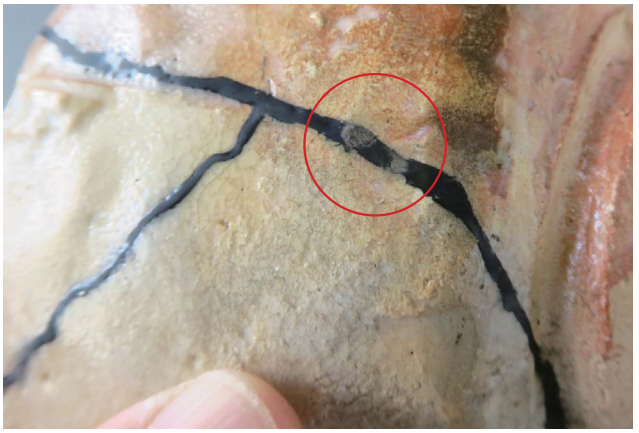
28 Wrap a piece of microfinishing film (superfine) to an eraser and sand to even out the surface. Wipe off with benzene.

29 Paint the nakanuri layer with kurororiro-urushi. Paint the inside first, then the exterior.

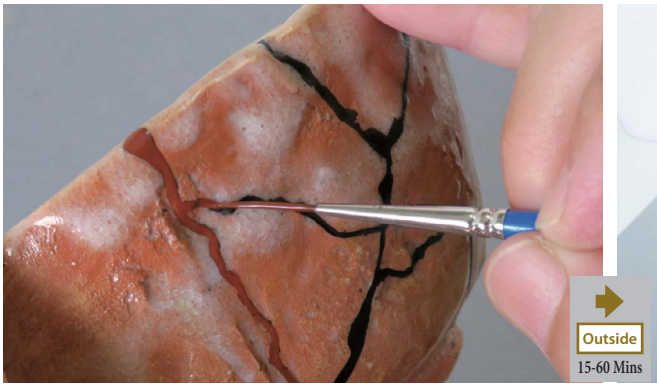
Helpful Pointers

Additional sabi-tsuke after painting with kurororiro-urushi

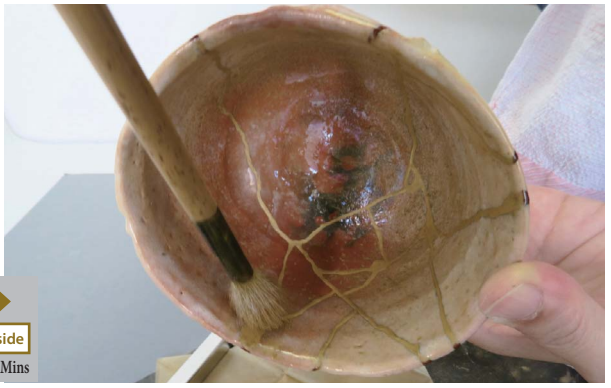
If you find a large crack while applying the kurororiro-urushi base coat glass-specific urushi, you may need to do an additional sabi-tsuke. Smaller cracks can often be managed with the base coat glass-specific urushi and nakanuri, so assess whether more sabi-urushi will be necessary. Make sure to harden with diluted ki-urushi if you apply more sabi-urushi.



STEP 6
Prepare for funmaki with e-urushi ~ funmaki



30 Strain the e-urushi mixture for sprinkling the gold powder. Paint a layer on the inside first, then paint the exterior.



31 Sprinkle the gold powder (keshifun) with a harai kebo.

32 Rotate the mawata to gently polish and set the gold powder. For more complex repairs, the time required for urushi application increases. Until you are comfortable with the process, it's a good idea to split up the powder sprinkling. For example, sprinkle the inside on one day, then the exterior on another day.

33 Wait one day before placing in the muro. Then place the vessel in the muro for 3 to 4 days to fully cure the urushi. Please wait about 2 weeks before using the mended vessel.

Glass Repair Requires Advanced Techniques and Ample Experience

Urushi is a food-safe way to repair glass

It is possible to repair glassware with urushi. In the past, glass repair utilized a transparent, UV photosensitive resin (not food safe), but I have since discovered urushi meant for glass. Through much trial and error, I am now able to repair glass tableware effectively.

The main difference between mending pottery and glass is that mended edges are visible all the way through with glass. Although there are techniques to hide this additional visibility with gold and silver, the brown hue of the urushi looks very much like beautiful amber and I don't think it's necessary to cover it up.

For glass repair, the surface preparation and urushi handling will take a little more time and effort compared to pottery repair. There is certainly room for improvement in this area of mending; however, there is a special beauty to glass repair and I intend to continue learning and growing this technique.

Lesson 27

Kintsugi Q & A

Answering Frequently Asked Kintsugi Questions

Q: What are the considerations for using vessels repaired with the kintsugi method?

You can use your urushi-repaired tableware without any food safety concerns; however, there are a couple of points to keep in mind. Do not place tableware that has been mended with urushi in a microwave, dishwasher, oven or directly on a stovetop burner. Also avoid soaking the vessels in water, and gently wash with a soft sponge. If stains become noticeable, do not use bleach. Instead, wipe the stained area with a melamine sponge, making sure not to touch the silver or gold sections. Bear in mind that kintsugi-repaired vessels have been broken before, which makes them especially delicate. Extra care will go a long way toward preserving the repairs.

Q: Where can I find the necessary tools and materials?

Urushi and the associated tools and materials can be found in specialty art shops and online. Etsy shops such as Christianbonner, Goenne, Hokoan, and KintsugiJapan, KintsugoLoo and others offer selected supplies and tools, and some offer kits. Please note that some of these shops are shipping from outside the US. Supplies and kits may also be found on Amazon (shipping varies by merchant). Start with a small kintsugi kit with the basic necessities, and gradually supplement with other materials over time. Many of the tools can be found at hobby stores, home improvement retailers, or can even be made by hand.

Japanese urushi and gold powder can be pricey. Take into consideration the scope of your project and budget to purchase the appropriate amount.

※ **The materials and supplies used in this book are featured on the "Monotsugi" home page (as of October 2017)**

Q: Please tell me how to store and maintain my tools and materials?

As the freshness of ki-urushi decreases, its capacity to harden and cure decreases as well. Purchase smaller amounts and try to use it up within one year. Store the ki-urushi in the refrigerator during summer months. Processed urushi such as kuroroiro-urushi and e-urushi can be stored at room temperature. After each use, clean the tube opening and tightly close the lid. From time to time, move and change the position of the tube. During kintsugi, paintbrushes used for urushi will be cleaned with cooking oil, but if the brushes will not be in use for an extended period, wash the oil off with soap.

Q: How should I mend a thin crack?

Sometimes the crack will be so thin that the urushi will not sink in. Instead of widening the crack by force, try soaking the cracked section in togi-jiru (water in which rice has been rinsed) for a day, which may stop the crack from spreading. Otherwise, apply urushi when the crack has naturally widened.

Q: My sabi-urushi does not harden.

During the summer, sabi-urushi will naturally harden and cure without a muro, but as temperatures dip the sabi-urushi will take longer to cure. If there is no visible change to the urushi, place the vessel in the muro for 2 to 3 days and monitor the progress. If the muro does not help with the curing, the urushi may be too old or the sabi-urushi may have been overworked when mixed or applied. The remedy is to start over by removing the urushi and applying a freshly-made batch of sabi-urushi. Read the instructions for making sabi-urushi again and make sure to use the sabi-urushi right away. This may require making a new batch with each application.

Q: I sprinkled the gold powder, but there is no shine.

First, check what kind of gold powder you sprinkled. In this book we feature two main types of gold powder: keshifun, which produces a matte finish and marufun #5 and #3 for a glossy finish. There are other types of hard metal powders that yield varying finishes. How the powder is polished will affect the finish as well. For example, if keshifun is polished too soon, the gold powder may sink into the urushi layer and will not shine much. For more information on the proper methods of sprinkling and finishing marufun, consult the store where the powder was purchased.

Q: After painting the kuroroiro-urushi or e-urushi layer, the urushi has shrunk.

A thick layer of urushi placed immediately into the muro will cause the surface layer to dry too quickly, causing shrinkage. When this happens, the rest of the urushi will not cure even after a month. The urushi will need to be removed with benzene or with a utility knife and a new, thinner layer of urushi should be applied. Place the vessel upside down for about an hour after applying the urushi, then put it into the muro (15 minutes in the summer, 30 minutes in the spring, 1 hour in the winter). Take it out after the appropriate amount of time and allow the urushi to cure naturally. During the colder seasons, place the vessel into the muro again the next day as needed. Proceed onto the next steps after the urushi has thoroughly cured.

Q: When I put the vessel in the muro, it got moldy.

If the humidity in the muro is too high or if the vessel was soiled from the outset, mold may develop. A muro made out of plastic has less ventilation and the condensation on the surfaces may need to be wiped down. There is also the option of using a more breathable, natural material for the muro, like wood. If there is mold growth, wipe it off with a damp cloth then disinfect it with benzene or ethanol. Allow the vessel to dry outside of the muro for about a week. Then proceed with the kintsugi steps.

Q: I accidentally smeared urushi on the vessel.

If the glaze is smooth and intact, any smeared urushi can be easily removed with a hera or blade so there is no problem. However, textured glazes or yakishime style pottery may require some scrubbing with nail polish remover (acetone). Use a cotton swab to get into the crevices. Any residual urushi will turn black in the muro, so about an hour after placing the vessel in the muro, check for any unwanted urushi residues.

Q: I can't tell if the mugi-urushi has fully cured.

When attaching broken pieces with mugi-urushi, apply some of the mugi-urushi on a small, clear piece of plastic at the same time. Make the mugi-urushi layer on the plastic about 2mm thick, and place the plastic inside of the vessel. Although the conditions won't be exactly the same as the mugi-urushi applied on the fragment pieces, it will give you a sense of how the urushi curing process is progressing.

Afterword

Dear reader,
Were you able to repair a beloved ceramic piece? Perhaps the abundance of mending options gave you pause, or perhaps the results didn't turn out quite the way you'd hoped. I've been there. Kintsugi requires practice, and even if your handiwork doesn't seem professional, the effort and time you put into the repair is precious. Don't be discouraged, and treasure these beginning steps. It makes me happy to think of you joining this delightful kintsugi club.

We have come to the end, and from the generous clients that contributed the featured vessels to the multitudes of people who helped along the way, I am so grateful to and for everyone who made this book possible.

Kaori Mochinaga

About the author

Kaori Mochinaga studied glass and ceramics arts at Tama Art University. After graduation, while producing and exhibiting her pottery work, she was an assistant instructor for the courses offered through the publication *Ikebana Sogetsu Ryu*.

She started studying lacquer restoration in 2008. For over 20 years, she has restored countless ceramic items and offered her kintsugi services under the moniker "Monotsugi" from her Tokyo home.

In 2013, under the tutelage of Miyako Kobayashi, she studied urushi painting.

She currently takes orders from her website (www.monotsugi.com) and has been collaborating with the D&Department retailer in Tokyo since 2014. She repairs over 300 vessels per year with Japanese urushi.

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KAORI MOCHINAGA is a creator of ceramic art who has repaired and restored countless pieces over the past twenty years. She is a teacher whose instruction has appeared in all forms of Japanese media. In 2014 she joined forces with popular home goods vendor D & Department Tokyo to foster the repair of valued ceramic and glass pieces. Her site Monotsugi (monotsugi.com) offers professional restoration services for clients with complex repairs or wanting special finishes.

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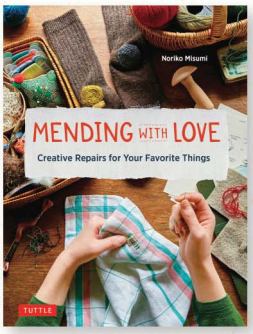

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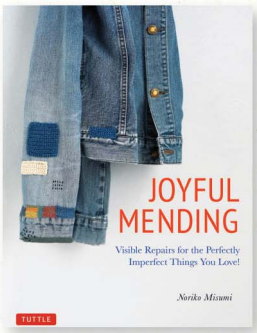

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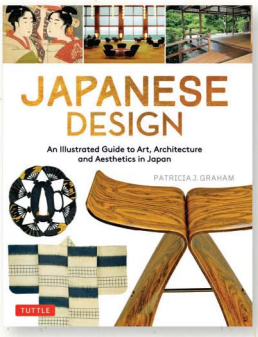

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