


Twisting Mokume

Step-by-Step – Simple Cuff Bracelet

*This handout is not intended to be complete instruction on its own.
Please refer to the videos, images and tips given during my live online class.*

1. We'll be using the 4" 5mm copper/brass mokume rod found in your kit.
2. Anneal - Heat to about 1200 F – this will be a visible red in low light. Overheating can ruin mokume, especially mokume with silver.
3. Secure one end upright in your vise – there should be at least ¼" secured in the vise. Ensure the top and bottom layers are touching the vise jaws, not the sides of the mokume.
4. Grab top end with your vise-grips as shown – at least ¼" secure.
5. Twist, keeping vise-grips level. Try for 2 complete revolutions, but if anything slips or it gets too hard to turn, stop and anneal. If slippage rounds the ends, re-square them with a file.
6. Anneal.
7. Repeat twisting if desired (anything from 1.5-3 complete twists looks good), anneal.
8. Forge as shown – careful of your holding hand!
9. Refine rectangle – hammer on short edge, both sides, to fill in dips from the twisting. Forge again on wide face, ideally ending up with a nice tidy rectangle about 3 x 7 mm.
10. Choose one side to pattern – “crazy file” as shown, using a fairly rough file. Go deep in areas, especially the tops and bottoms (rather than stripey sides). Do not take down evenly – be crazy.
11. Optional – file shallow angles on top edges all the way along as shown –  this makes for a more interesting pattern, but takes patience.
12. Refine all filed areas with sanding discs.
13. Anneal. If you like the pattern, proceed to step 14. If it needs more detail, repeat from #10.
14. Forge again; the idea here is to consolidate all the hills and valleys you've made with your file and the sanding disc, again achieving a smooth rectangle that is straight and the same width all the way along.
15. Anneal.
16. Forge and/or roll to final needed length. If you forge more, you'll get more width. Once you start rolling, you'll only get length.
17. If rolling, your bracelet blank may warp and curve sideways. This is the result of uneven forging. Fix as shown, before the bracelet gets too thin.
18. How long should a cuff bracelet be? Wrist circumference (loosely, where the bracelet will be worn) minus about ¾" of an inch. 5.5" is a good women's medium, or 6" women's large. 6.5"-7" for most men's wrists. Err on the long side – you can always trim it later.
19. Once your blank is the right length, you've achieved “tongue depressor stage” and can start filing, yay!
20. Sand ends and edges with 280 as shown, then top and bottom.
21. Form to cuff shape.
22. Sand with 400, then 400 polishing cloth.
23. Clean, patinate and seal. Patinate copper/brass mokume with liver of sulphur as shown.

Twisting Mokume

Step-by-Step – Star Pattern

*This handout is not intended to be complete instruction on its own.
Please refer to the videos, images and tips given during my live online class.*

1. We'll be using the 2" 6mm copper/brass mokume rod found in your kit. Locate and anneal. *Please note: if you didn't buy the deluxe kit, but you do have a rolling mill, you might want to save this piece of mokume for the Mizu pattern tomorrow. Watch this whole demo before deciding.*
2. Repeat twisting steps from cuff bracelet. This material is both thicker (6mm) and shorter (2"), so it will be harder to twist. Don't skimp on the amount secured in the vise! Get it in the vise and vise-grips TIGHT, and only expect to get one full twist per annealing. (With star pattern mokume, you have to start thick as you'll be sawing it in half. I don't recommend using anything smaller than 6mm rod to twist – you'll end up with very tiny pieces.)
3. Repeat 3-4 times – the more twists you have, the more stars you'll see later. In fact, you'll see exactly one star per half-twist. Keep track, try for 3 full twists.
4. Anneal.
5. Forge to square or round – this will make it easier to keep track of the middle as you saw.
6. Draw a sharpie line down the middle of your rod. This is your saw line – be as accurate as you can.
7. Saw in half. Sounds simple doesn't it?? Use a larger sawblade – at least a #1, up to a #3. Secure in vise as shown, use lubrication. Notice the angle of the rod in the vise. Notice how I use both hands on the handle of the saw – this helps to keep the blade vertical. Expect it to take 20-30 minutes total - don't start when you're hungry. Reposition (move the rod farther out in the vise before you saw too close to the vise.
8. Saw over half way, then turn, secure the sawn half in the vise and saw the other side.
9. Try to meet up in the middle.
10. Tips: don't rush, don't push, keep adding lubricant like burlife, change the angle of attack slightly every few minutes (tip forward, tip back) but always a vertical cut (never listing to the left or right).
11. Trust me, there are stars in there! If your two pieces have a bur, a level change, or even an undercut, file that off now.
12. Use sanding disc on surface of stars.
13. Anneal.
14. Forge as desired.
15. What next - earrings? Two pendants? Key fobs? Forge to 1mm thick then sweat solder onto a larger piece of silver? Curve each unit and solder back together in a boat shape? It's up to you!

Twisting Mokume

Step-by-Step – Mizu Pattern

This handout is not intended to be complete instruction on its own.

Please refer to the videos, images and tips given during my live online class.

1. You'll need 5mm mokume rod – you can use your entire deluxe piece for this, roll down your saved 6mm 2" copper/brass rod, or use any mokume rod you might have from Reactive. I'm using the same mokume as your deluxe kit mokume, only mine is 3" instead of 4".
2. Anneal – *attention and caution if you are using mokume with silver *– do not overheat! Mokume with silver layers will melt if it approaches the eutectic temperature of 1435F.
3. Twist, keeping vise-grips level. For the mizu pattern, you don't need a tight twist. I'll be doing 2 full twists for my 3" piece – go for 2-3 twists if you're using your 4" piece. This might take more than one anneal.
4. Anneal.
5. Forge just like we did for the cuff bracelet yesterday, making a rectangle cross-section.
6. Into every mokume artist's life, a few delams must fall. Silver/copper alloy mokume is prone to delaminating, especially when forging after twisting. All is not lost!
7. Pickle a good long while, then solder with easy solder.
8. File off excess solder, then proceed with 'crazy filing' on one side.
9. Smooth with sanding disc.
10. Forge to consolidate.
11. Flow easy solder into delams, get a free anneal in the process.
12. As before, file off excess solder before any forging/rolling. *Decision time! You could change gears here and finish this as a simple cuff bracelet – if so, proceed with yesterday's lesson from step #16. Otherwise:*
13. If you have a rolling mill, roll to about 1-1.3mm thickness. If no mill, forge to this thickness. (1mm = 18 gauge. 1.3mm = 16 gauge.)
14. Anneal.
15. Get out your stamp tools! (For those of you that have done stamp-patterning, this is what we're up to.) You'll want a dull round stamp so you don't stamp too deep. A small chasing tool would work.
16. On a sturdy wooden surface, start stamping in dots (or other small shapes) on your long strip of twisted mokume. Stamp on the REVERSE. The reverse will have just candy-cane like stripes, not as interesting as the deliberate patterning you put on the front. Use a hammer meant to be used on steel stamps, NOT a nice forging/planishing hammer. *Caution: if you stamp too deep OR file too much, you'll create thin areas. Go for just enough detail, not so much that you are going through too many layers of the mokume.*
17. Your stamps should be raising bumps on the top surface - ideally less than half the thickness of the metal.
18. Flip the piece over, and file off the bumps.
19. Use the sanding disc to smooth the file marks.
20. Anneal and pickle. Have a close look to see how the pattern has changed. If you see a lot of rings close together, you may have stamped too deeply. If nothing much has changed, you could probably have stamped harder and/or filed more. In this case, you could stamp the area again, then file and use sanding disc again.
21. Forge to consolidate. If your mokume is curving as you forge, correct by forging more on the inner edge of unwanted curves – they'll straighten out. I do not recommend sending this material through the mill. Probably don't attempt to completely erase the dents on the reverse; it'll make the material quite thin.
22. Depending on the length of mokume you used and your experience level in forging, you may have a nice straight piece of patterned mokume 8" x about .8mm thick. Good job!
23. If your mokume has silver, use Baldwin's patina instead of liver. This is really just to see the pattern clearly – no need to seal with wax until you have a finished piece.

Patinas

Liver of sulfur Patina

If you don't have this already, you should get some. Liver of sulfur is a very common patina that will color copper, silver, brass and other metals. Purchase from Rio Grande or other jewelry supply or metal suppliers – I like the gel form better than the little rocks. We'll use it in such a way as to darken the copper but not the brass.

1. Clean your metal. This may involve some sanding – all oxide buildup from annealing or soldering must be physically removed with sandpaper by hand. Use 400, then follow in opposite direction with 400 polishing paper.
2. De-grease and apply a light 'tooth' using pumice, baking soda, or no-name patina prep as shown. There are many variations here – some use simple green or dish soap and scotchbrite.
3. Prepare liver solution - with a brush, add about a pea-sized amount of gel to ½ cup room temperature water and stir to dissolve.
4. Gloves would be a good idea, if you don't want your hands to smell like rotten eggs.
5. Dip your piece into the liver – hold at edges and agitate the piece as shown. Color will develop rapidly.
6. When the copper is dark but before the brass goes dark, remove and rinse well.
7. Troubleshooting – if the brass goes a deep gold, you won't see as much contrast. If this happens, you can repeat step 2 and try again. If you have yellow household ammonia, add a few drops to your liver solution. This will help the brass stay yellow.
8. Rinse well, then dry. Apply sealant.

Baldwin's Patina – for mokume with silver

Baldwin's patina was invented and marketed by the fabulous Phillip Baldwin - owner of Shining Wave metals, maker of mokume, blacksmith, and Forged in Fire contestant. It is available from Reactive Metals. Although the recipe is proprietary, it is pretty clear that Baldwin's contains ammonia, salts and cupric sulfate. In his words it is 'as close a match to human sweat as I could get!' Moving right along

The color obtained from Baldwin's is like speeding up the normal oxidation process that might happen if you left a piece of metal lying around in your toolbox for a year or so – brown for copper, deep gold for brass, gray for shibuichi, black/purple for shakudo.

We love Baldwin's because it does not affect silver, and it is so easy to use. This makes it the go-to choice for patinating any silver-bearing mokume. Silver/copper, silver/shibuichi, etc.

1. Clean your metal. This may involve some sanding – all oxide buildup from annealing or soldering must be physically removed with sandpaper by hand. Use 400, then follow in opposite direction with 400 polishing paper.
2. De-grease and apply a light 'tooth' using pumice, baking soda, or no-name patina prep as shown. There are many variations here – some use simple green or dish soap and scotchbrite.
3. For small items, dip a q-tip into your bottle of Baldwin's – rub over the surface of your piece, getting every part of the surface. Wait a bit, then rub again. It takes a little time for the color to develop. You can rinse, then dry and apply again. Contact with the air helps the patina develop, but don't let the solution dry on the piece – either rub again with more solution, or rinse.
4. When you have the color you like, rinse and dry, then seal.

Twisting Mokume