Polymer Clay Daiza

by John Palmer

How to make polymer clay daiza for small stones:
Polymer clay has become very popular with artists and crafters because it is versatile, easy to use and just plain fun to play with. For suiseki enthusiasts, it is a wonderful material for easily making *daiza* for small stones. So let's get into some of the basics:

What is polymer clay?
First of all, it is not a clay; rather it is fine particles of polyvinyl chloride (PVC) suspended in a plasticizer which makes it pliable and easy to form. Once formed it can be fired at temperatures so low that you can do it in your oven or in a toaster oven. Shrinkage is only about 2 percent, negligible for small stones.

What sort of tools do I need?
Not very much to give it a try. You do need a flat surface like a sheet of glass or easier yet, a piece of freezer paper taped to a flat piece of wood or plastic. You also need a sharp knife like an *Exacto* knife and a dedicated rolling pin. You also need an oven. Since there is a toxicity issue, just to be safe, it is best not to cook your meat loaf and your *daiza* in the same oven, particularly at the same time. A simple solution is a dedicated toaster oven which you can often find at a garage sale - just make sure it works!

In addition, if you use a toaster oven, you will need a small bag of polyester Fiberfil, sometimes called Poly-Fil, and a small copper or brass plate that fits in your toaster oven - all from your local craft store. Also, some aluminum foil.

If you get frustrated trying to condition the clay by hand, a process we will explain shortly, you will want a pasta machine. In fact, conditioning by hand can be very time-consuming and discouraging. So, if you seriously want to try this, get a pasta machine right away. That's basically it.

Is polymer clay safe to use?
This is a controversial issue. Although the major brands of polymer clay are "certified non-toxic", I'm skeptical - too much fine print. It is best to err on the side of caution.

Avoid eating or inhaling PVC particles. It is important not to use your polymer clay tools for any other purpose. Particularly avoid any contact with food. Clean your hands thoroughly before touching anything else.

Do not burn the clay during firing because the fumes are likely to be toxic as well. When baking the clay, make sure that the temperature does not exceed 300° F.

In order to avoid stray particles, sanding, if needed, should be done wet with wet-dry sandpaper. In addition, be careful where you place unfired pieces as the plasticizer in the clay can attack wood finishes and some other plastics. Once fired, these problems all go away.

So, why should I do this?
As you will see, the material is quite easy to work with and with a little practice, you can achieve excellent results with not too much effort. Think about all those little stones sitting around anxious to be nicely displayed. You just have to do it sensibly.

What brand of polymer clay is best?
Brands include Fimo, Scupley III, Premo and Kato. They are all pretty much the same, but I tend to use mostly Premo and occasionally Fimo . See below:

Lets' get started
We are going to start out by making a very basic *daiza* for a small cut stone, just so you can see how it works. Later we will graduate to an uncut stone. The stone selected for the first demo is shown in the figure below. It measures 2 3/4 inches high by 1 7/8 inches long.

Step #1 Condition the clay

Select a clay color suitable for the stone. In this example, we will be using Premo Burnt Umber. The clay must be conditioned to soften it and make it workable. The reason is that the manufacturing process aligns the molecules. These need to be randomly distributed in order for the clay to work properly.

The simplest way is to work it with your hands for several minutes. Try a 1/2 ounce chunk to start with until you get the feel of it. Cut it into lots of small pieces. Pick up a few pieces, squeeze them together and roll them against a clean hard surface or roll it between your palms. When you have a nice fat worm, move your hands in a circular motion to change it into a ball. Then back to a worm. Repeat several times and you will sense that it is softening. Pick up a few more pieces and do another one. Then put these together. Eventually you will end up with a bigger chunk of "conditioned" polymer clay.

Conditioning by hand can be very time-consuming. So if you really intend to give this a serious try, run right out and buy a pasta machine. It will save lots of time and eliminate much frustration. (If you do, skip Step 2 and go on to Step 2A.)

How long do you condition clay? This comes with experience as you see and feel the changes. Depending on the clay, its age, the temperature and how much you ate for breakfast, it may take 5 or 10 minutes. You can't condition it too much although you may find a particular batch that may soften too much and get "sticky". If you encounter this, just set it out in the air overnight or chill it for an hour or so.

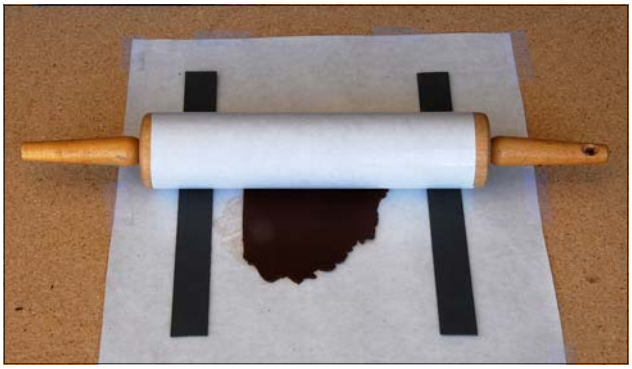
There are some tricks to speed this up. Seal the clay in a plastic bag and set it in a warm place, like in some lukewarm water or out in the sun. (If you are so inclined, you could sit on it for 10 minutes or so while watching TV.) Some folks use a dedicated food processor to chop up the clay at the initial step.

For this particular stone, since it is relatively tall, dictating a thicker base, I started by conditioning a full package (2 ounces) of Premo using my pasta machine.

Tip: If you have to stop working on your project for a day or two at any stage, wrap your clay up in Saran Wrap or equivalent to keep it pliable.

Step #2 Make a flat slab the hard way

Assuming your pasta machine has not yet arrived, you will need a flat surface, some freezer paper (wax paper will do), some tape, some spacers and a rolling pin. The flat surf can be a piece of wood, MDF, fiberboard, or even a piece of glass - maybe 12 x 12 inches although a little bigger would be better, providing more stability. Next tape the freezer paper to the board. Then find some spacers about 1/16 of an inch thick. (The thickness of the spacers in effect determines the thickness of the *daiza*.) I used mat board here, but anything will do. Place the clay on the board. Then place another piece of freezer paper on top of the clay. You can also tape the freezer paper to the rolling pin as shown in figure below. Roll it out flat. Fold the



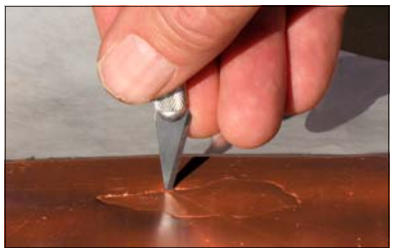
clay in half, rotate 90 degrees and roll it again. Repeat until you get a nice flat surface of even thickness.

Step #2A Condition and make a flat slab the easy way

You can make the whole process a lot easier by investing in a pasta machine (at right). Not only does this make it easier to make slabs, but also it can be used to condition clay quickly and easily. Cut the clay into small pieces as previously described and squeeze a few together as best you can. Set the pasta machine at its maximum spacing between rollers and run each little batch through several times. Then put them together and run them through. Soon - very soon - you will have a nice conditioned flat slab of the best thickness.

Step #3 - Make the rim layer

The objective here is to make a visible impression in the flattened clay. If you press it in too firmly, the stone will probably stick and mess everything up. So press the stone in lightly. Then holding the stone against the clay, turn it over, and then with your fingers, lightly press the clay downward along the edges progressing around the perimeter. The resulting impression is shown here:



Next, using a sharp Exacto knife, cut out the internal piece. Hold the knife vertically and try to make a continuous cut all the way around (at left).

Remove the interior cut section. If there are any ragged areas along the cut line, carefully clean them up with the knife. See below:

Now replace the stone. Turn it over and look carefully to make sure you have not trapped any clay beneath the stone.
Sguiggle it around as needed until it falls in place (figure at left).

Then cut out the rim layer leaving around 3/8 to 1/2 inch clearance around the stone. Make sure that the clay hasn't adhered to the paper underneath, If it has, carefully free it up. Slide the clay and stone onto a fresh piece of freezer paper (figure below).

Examine the clay carefully looking for separations between the stone and the clay. Gently push in the clay radially from the outside to fill any gaps. Also, make sure that the clay is flat. If it has raised up a little, gently press it down. The idea is to do as little work as possible later on, so keep the rim surface clean and flat.

Step #4 Make the base layer

In this case, because the stone is tall, you need to make a fairly thick base layer. If you are using the rolling pin method, it is best to condition three (or even four) thin layers of clay large enough to accommodate the rim.

Then just increase the thickness of the spacers to about 3/16 of an inch and roll them together. Don't be tempted to skimp on conditioning. If you are using a pasta machine, condition three layers of clay and then roll them together using the rolling pin. You won't need the spacers for this if you do it carefully and apply even pressure.

To make sure that the layers are sufficiently pressed together, cut down through your sandwich near the edge and verify that there are no gaps. If there are gaps, roll it a bit more.

Step #5 Assemble the base and rim layers

Carefully lift up the rim layer and the stone and place it on the base layer. You may find it easier to pick up the freezer paper with the rim layer and stone, position it all on the base layer and then slide the freezer paper out. Check the clearances and gently push the clay into place if needed.

Remove the stone then lightly roll the layers with your rolling pin. You want to make sure there is good adhesion, but you certainly don't want to roll it too hard to effect the fit. So just apply a light pressure to the rolling pin, look at it, and if the rim layer doesn't look well adhered, roll it again, maybe a little bit heavier. You can test it by trying to lift up a flap around the edges. This is not really tricky; you will probably get it right the first time.

Afterwards, make sure that the stone still fits. Now is a good time to rough cut the base layer to remove excess material - a good opportunity to practice your vertical cut. See below:

Step #6 Cut the *daiza* to shape

Decide on the width of the lip, about 1/8 inch. You don't want to try to replicate all the internal ins and outs. Rather you want to make a nice smooth curve on the outside all the way around.

For thin *daiza*, it is best to make one smooth continuous cut all the way around in order to minimize the amount of sanding later. Make the first cut so that the rim is a little wider than the final width, maybe 1/4 inch wide.

It is important to hold the knife straight up and down so that you get nice vertical sides. Don't forget, you need a sharp knife blade. This wider rim cut will let you see how you are doing and adjust your technique as necessary. Of course, remove the stone while making the cut.

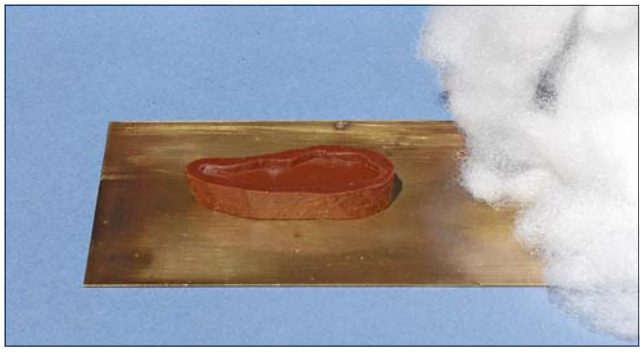
In this particular case, the *daiza* is relatively thick. It is better to make a series of trimming cuts rather than a continuous cut. The figure above shows the rim width at about 1/4 inch - still more to go. Go slowly keeping the knife vertical, because now that you have gotten this far, it would be a shame to mess it up.

Figure below shows the *daiza* shaped to the final rim thickness. As you can see, it will need some sanding later.

Step # 7 Bake the *daiza*

Don't worry, the feet will be applied later. The big advantage to polymer clays is that they cure at a low temperature, typically 275 degrees F for 30 minutes, (check your brand).

Toaster ovens are notorious for having larger temperature swings. You can confirm this with a small oven thermometer if you like. In fact, it is a good idea to check out your toaster oven to see if the mean temperature is close to what the setting indicates it should be. It is important to maintain a fairly constant curing temperature. To accomplish this, set the *daiza* on a small plate (in this case, a brass plate bought at a craft store) (see below) and



cover the *daiza* with Fibrefil® to insulate the stone from temperature swings.

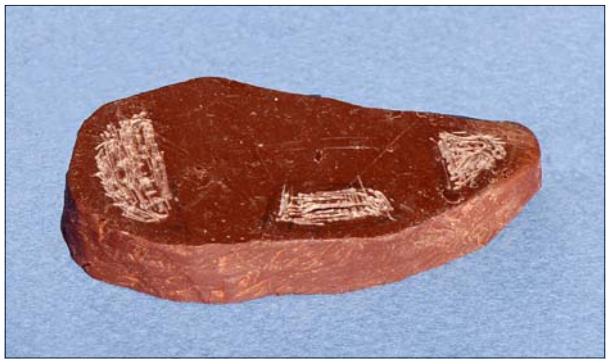
Now wrap the plate, *daiza* and Fibrefil® with aluminum foil and put it in the toaster oven (see below). Set your timer and start cooking.

Tip: Sometimes it is a good idea to put the stone in the daiza and cure it with the stone in place, particularly for stones with natural bases.

Tip: If the stone does not fit well after the daiza is cured, simply heat up the daiza in warm water and try to fit it in again.

Step # 8 Apply the feet

Decide where to place the feet. For a small stone usually three or sometimes four; one at each end plus one under the peak or the location with the heaviest visual mass. Carefully score these areas with your sharp knife (see below) to improve adhesion. Remove any particles with a stiff brush.



Cut out some small pieces of flat conditioned clay, place them in position, turn the *daiza* over and press down very firmly and evenly on a flat surface. Check to make sure the surfaces are still flat. If not, try again.

Tip: Sometimes it is hard to apply even pressure and maintain flat surfaces when there are three feet. Temporarily place a fourth balancing foot opposite the odd foot. After pressing, remove it.

Next remove the excess by cutting down from above to define the edges of the *daiza*. Turn it over and carefully cut down to define the feet. If you press down too hard, you will score the *daiza* base, so go slowly. Cut straight up and down on the external surfaces and at an angle on the internal surfaces (see below). Use your knife to press the clay where needed. It is difficult to refine these tight places later, so do the cleanest job you can at this stage.

Step #9 Bake the *daiza* again

Step #10 Finishing the *daiza*

Tip: When working with a thin daiza, you may be able to smooth the edge satisfactorily without the need for sanding. Try smoothing lightly with your fingers or try rolling the edge with a ball point pen barrel.

You will most probably need to sand the surface of the *daiza*. Use wet-dry sand paper starting at 320 grit working up to 600. If you are really finish fussy, consider going to 800.

Sand wet to avoid dust. Fill a bucket with water and sand under water. An easier way is to sand above water and frequently, very frequently, dip the *daiza* and sand paper in your bucket to remove the accumulating slurry. Back the sandpaper up with your fingers or a small flat piece of wood or a short dowel, whatever works for you. Start with 320 grit, then 600. If you have been careful cutting the *daiza* to shape, sanding only takes a few minutes.

Tip: This maybe seem to be cheating, but if you run into a scratch that you can't seem to sand out, shave it out with your knife. Do this wet and dip your daiza and knife frequently in water to remove shavings. Then re sand.

Some people also buff polymer clay, but I have not found this to be necessary. If you do buff, be very careful with dust. Set up a big fan and blow it into the neighbor's yard.

Dry the *daiza* thoroughly before finishing. There are all sorts of commercial glazes available that can be applied by dipping or painting. I use Future Premium Floor Finish.

If you are going to add some inscription to your *daiza*, like your initials and where and when you found the stone, now is the time. Use acrylic ink. Let it dry.

Apply two coats of Future acrylic with a brush, with 8 hours minimum between coats. The finished *daiza* is shown below.

Tip: If you prefer a matte finish, stop sanding at 320 grit to leave a little rougher surface.

The stone with its new *daiza* is shown below.

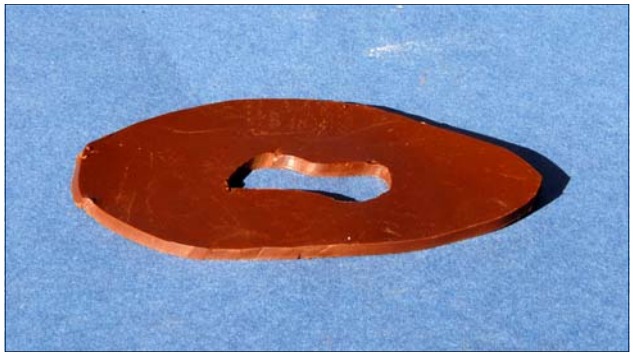
Uncut Stones

Let us move on to some of the tricks for uncut stones. Most of the things you have learned above apply to uncut stones as well, particularly since a thick base was needed for the preceding stone.

Start with the little desert creature shown at right. It measures 2 inches high by 2 5/8 long. Clearly the bottom of the stone is irregular and again it will need a fairly deep *daiza*.

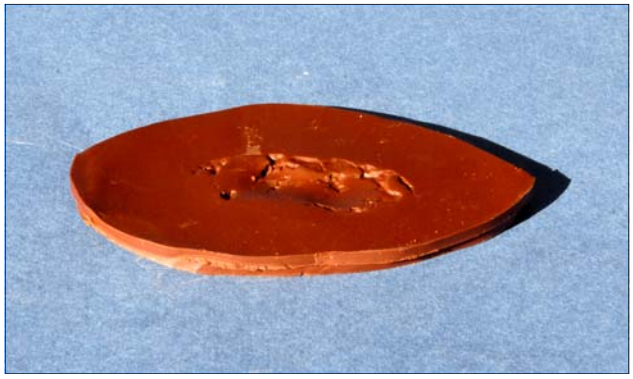
Press the stone firmly into a slab of conditioned clay. Press straight down angling the stone if needed. For this stone, the impression is shown below. Not much of a first impression, but it will do.

Now cut out an area roughly defined by this impression. You need not be especially fussy. See below:



Using the first piece as a template, cut out another slab of clay to roughly the same outside shape. Place the new slab on top of the cut slab and roll it with your rolling pin to adhere the layers. Pick it up and press the new layer in a bit so you can see where the depression is.

Position the stone and again press it in firmly to establish a new impression (see below). As you can



see below, the recess is growing as the stone penetrates deeper into the clay.

One more layer was added and in this case the stone seems properly seated as shown in the next picture but if it were not, just continue this process

adding new layers until you are satisfied. Lastly add a final slab on the bottom, roll it again and check and adjust the fit of the stone if needed.

Then cut to shape, bake, apply feet, bake and finish as described in steps 6 through 10 above. Note: in this case, I left the stone in the *daiza* while baking. I am not sure this is really necessary; it just seems like a good idea for a stone with a natural base. The stone with its new *daiza* is shown below.

Some final thoughts:
The Internet is loaded with information on the techniques of polymer clay. Do a search on whatever aspect interests you.

Just to give you an idea about how fast you can make a *daiza*: it took just under 10 minutes to remake the base *daiza* for the second stone above (with no pauses for photographs). This was starting with four slabs of conditioned clay from

the pasta machine, assembling the *daiza* base and cutting to shape - ready for the first bake.

I hope you all enjoy making your new *daiza*. Like everything else, there is a learning curve, but I am sure you will pick it up quickly. In fact, you will probably find some better techniques which I would love to hear about.

Have fun!

John Palmer [email: suiseeker@gmail.com]

Frigate

Mountain

Bear

Shaggy dog

Turkey

Chicken