**Standard of Procedure – Grain mount in epoxy**

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**Objective:**

The purpose is to outline the necessary steps in preparing an epoxy plug with individual grains that can be used to conduct microprobe analysis.

**Procedure:**

1. Use the belt sander to grind off a small amount off end of 1-inch metal cylinder. Do not touch the polished surface as this will cause epoxy to leak from plug.
2. Use Q-tip to apply a thin layer of release agent to the inside of the metal cylinder to allow the epoxy to be removed after curing.
3. Apply 1-inch sticker to polished base of cylinder.
4. Place grain(s) into cylinder and arrange on sticker using a toothpick. Grains near the edge of the plug will not be analyzed by the microprobe so keep grains near the center. A pattern, such as rows, will allow for easier analysis.
5. Weigh plastic mixing boat and tare to zero for epoxy measuring.
6. Add 4.2 g of EpoFix resin and 0.5 g EpoFix hardener, mixing for one minute with a toothpick.
7. Pour mixture into metal cylinder. Use caution to keep mixture off the sides and to pour smoothly/evenly.
8. Use a toothpick to wiggle individual grains and help all air pockets float to the top. Bubbles in this location will not affect results.
9. Let dry at room temp for about 24 hours.
10. Put plug into oven to cure at 60\*C for 1 hour. This will remove stick residue from surface of epoxy.
11. Remove the epoxy plug from the metal cylinder by inserting a smaller metal cylinder and gently tapping with a hammer.
12. Remove the sticker from the top of the plug and use coarse diamond lap to grind excess residue from plug. Use caution to avoid grinding away too much of the sample if grains are very small.
13. Shave sides down if plug doesn’t fit in round sample holder. \*\*use caution to ensure even distribution.
14. Turn on computer located above polishing machine, compressed air, and light in work area.
15. Insert plug into circular holder. The sample must be secured tightly to ensure surface is polished correctly. All holes must be filled and have a uniform height (very little exposed above holder).
16. Insert holder into machine. Machine must be positioned all the way to the left.
17. Using a 45-micron plate, polish the sample for 30 seconds while keeping moist with spray bottle of water.
18. Use head pressure knob and adjust air pressure to 20 psi. Ensure it remains near this value while polishing.
19. Repeat steps 14, 15 and 16 using a 15-micron plate.
20. On computer-

type **c>pump on**

Press enter. This begins the automatic pump which will put diamond solution onto the polisher during the next steps.

1. The pump must be in off position if polisher not in use. The switch is located under the computer. A good setting to start is 1.5. This will dispense diamond solution at a steady rate with minimum waste.
2. On computer-

type **c>pump 15 3**

Press enter.

1. Partially fill beaker with 6-micron diamond solution. Set beaker on magnetic stirrer and insert plastic tubing from electric pump into filled beaker. Clip second tubing so it is aligned to dispense onto grinding plate during operation.
2. Install 6-micron plate and attach circular sample holder into polishing machine. Move switch to forward position on the pump regulator. This will allow the diamond solution to start flowing at a predetermined interval. Increase speed from 1.5 if the plate appears dry.
3. With the machine positioned all the way to the left, press start on polishing machine and grind plug for 2.5 min, ensuring the head pressure remains near 20 psi.
4. Use the pump regulator to stop the solution from dispensing (flip switch to off).
5. Repeat step 23 using the position 1, 2, and 3 (gradually moving the machine toward the right).
6. Rinse plug sample holder using DI water and place in ultrasonic bath for 5 minutes to remove all 6-micron diamond solution.
7. Reverse the pump to purge the diamond solution from the tubing.
8. Use water beaker to rinse the tubing by moving switch to forward position.
9. Repeat steps 22 through 29 using 3-micron and 1-micron solution and grinding plates.
10. Set aside each grinding plate to air dry before putting away
11. Wipe surface of plug dry with kimwipe.
12. Wrap the plug in a kimwipe and store until carbon layer is applied.

**Risk of Hazard**

Avoid wearing loose clothing and tie back long hair when using the machinery listed above. Jewelry could also get caught in the rotating mechanisms of the machines. Use protective eyewear when operating belt sanders and grinders. Use glove and protective eyewear when manipulating the epoxy.