**Standard Operating Procedure: Thin Section Sample Preparation**

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**Objective:**

 To convert raw stone material into thin sections 30 µm thick to be used for petrographic and EMPA analysis.

**Procedure:**

1. Using a 150 grit (93 µm) Buehler Ecomett III diamond grinding wheel, grind samples by hand to achieve a uniform flat surface.
2. Grind samples by hand again using a 280 grit (43µm) Buehler Ecomett IV diamond grinding wheel to secure a flat sample surface.
3. Using a Diamond Pacific grinding belt at 150 grit (93 µm), round off sharp sample corners and create a 45° bevel on all four sample edges.
4. Rinse samples with water and set to dry in a drying oven at 100° C for approximately 5 minutes.
5. Place glass slides frosted side facing down on top of a hot plate set to 200° C.
6. Create an epoxy/resin mix by adding 3.5 g Hillquist resin with 1.5 g Hillquist hardener and mixing throughouly, set in drying oven for approximately 2 minutes.
7. Take one dry sample out of the drying oven, and spread the even epoxy/resin mix evenly over the flat surface that was ground flat by hand.
8. Take one glass slide off of the hot plate, and gently lower frosted side down onto the sample coated with epoxy/resin.
9. Using a circular motion, move any bubbles trapped within the epoxy/resin outwards towards the sample edge and away from the glass slide.
10. Place sample glass side facing down onto a level surface, allow to dry at a minimum of 24 hours, and repeat steps 6-8 with remaining samples.
11. Once dry, engrave the sample ID number onto the glass slide using a diamond tipped engraving pen.
12. Using a Buehler Petro Thin thin sectioning system, grind samples down to ~250 µm in thickness at 250 µm increments. If samples are too thick to be placed into the Petro Thin, cut the stone side of the sample using a circular saw to the desired length to fit.
13. Grind samples by hand on a RatioPax DC Motor Control grinding wheel using 220 grit (68 µm) silicon carbide powder to achieve a thickness of 140 µm.
14. Grind sample down again on the RatioPax wheel using 400 grit (22 µm) silicon carbide powder to qualitatively ensure feldspars appear a burnt-orange color on a Michelle Levy Bifrengence color chart, when looked at underneath cross polarized light on a petrographic microscope. Samples should not fall below 135 µm in thickness.
15. Take samples back to the Diamond Pacific grinding belt and round off GLASS corners of each sample using a 15 grit belt.