

GRAIN THIN SECTION

Unlike the above discussion of thin section preparation of rock, concrete, mortar, aggregate, stone, and other solid samples, thin sections of powdered and fragmented materials such as fine sand, pea gravel, cement, whole or crushed clinker, raw feeds, ground pozzolan, etc. are usually prepared in a different manner. The procedures are simple and require less time than a usual thin section of concrete. Three methods are common.

The first method involves usual encapsulation of powder or crushed material in castable epoxy in a mold as a thick, viscous, paste-like consistency, followed by curing, sectioning, grinding, bonding the ground surface to a frosted glass slide, precision sectioning, precision grinding to the final thickness, and optional polishing.

The second method involves applying a thin film of epoxy to a clean, dry, frosted glass slide and sprinkling the fine powder (of cement, fine sand, clinker, raw feed, etc.) over the epoxy (or placing the powder first and then applying a few drops of epoxy), or applying a thin film of a "paste" of already mixed epoxy and fine powder on a frosted glass slide, letting it to cure either in air or in an oven, grinding the surface down to a smooth plane to expose majority of the grains, and slow, continuous grinding, and occasional coarse polishing to the final thickness. The thin section can be further fine polished or covered.

For relatively coarser grains such as pea-sized whole clinkers, crushed clinkers (1 to 2 mm), sieved fine aggregate particles (having uniform grain size of most of the particles), and finer fractions of coarse aggregates, the grains are either sprinkled over a clean, dry, and frosted "working" glass slide coated with a thin film of epoxy, or, the grains are first soaked in an epoxy medium and then removed from the epoxy with forceps and placed on the working glass slide (epoxy from the wetted grain surfaces will provide the necessary bond to the frosted surface of the glass, Campbell). The grain mounted glass slide is cured either in air, or in an oven, or on a hot plate at 40-50°C and then either thin-sectioned in a precision saw and/or ground down to expose full cross sections of majority of the grains. The sectioned and ground surface is then bonded to a clean, dry, frosted glass slide, which will be the final "sample" slide. The sample sandwiched between the two slides is then further processed by second precision sectioning and grinding of the sample slide down to the final thickness of 30 to 40- μm . The companion side of the thin section left over on the working glass slide from precision sectioning can be further polished on a horizontal rotary wheel with a suitable

slide holder for reflected-light or SEM examination.