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MOUNTING AND POLISHING SMALL QUANTITIES OF MINERALS

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ABSTRACT

A Millipore filter which has retained micrometer-sized particles is consolidated by partial solution and subsequent evaporation of amyl acetate. The flat, hardened matrix may then be ground and polished.

During the study of carbonaceous meteorites and lunar dust, a method for mounting and polishing small quantities (down to 1 mg) of density centrifugates and chemical residues was developed.

The key of this method lies in the limited dissolution of cellulose esters by amyl acetate, followed by the evaporation of the latter, leaving the particles strongly held in a hardened matrix, whose flatness is given by a solid base during a short period of softening.

MOUNTING THE POWDER

The minerals are dispersed in dust-free carbon tetrachloride and quickly filtered through a Millipore filter, type MF, with openings of less than 1 micron. After the filter has been dried in a dust-free atmosphere at room temperature, it is placed on a flat plate of transparent polymetacrylate, whose shape fits in the polishing machine. Dust-free amyl acetate is then quickly poured onto the filter with a pipette. If the disc shifts, there is time to correct its position.

The preparation is allowed to dry and harden in air at room temperature, which takes a few hours. The plate is then covered with a cellulosic varnish or any cold-settling plastic compatible with metacrylate and cellulose esters. Good results were obtained with polyesters; epoxy resins gave bad results.

GRINDING AND POLISHING

A minimum-loss procedure was developed along the following lines;

1. the thickness of the embedding plastic is reduced on water-proof corundum paper n° 500. The preservation of the particles is monitored by a diffuse light source or under the microscope.
2. rough polishing on Buehler's Texmet or Scandia's Scandipellon pad with 1 μ m diamond and kerosene, at 250 rpm and with 300 g pressure.

3. fine polishing on Texmet or Scandi-pellon with 0.1 μm diamond and kerosene, at 125 rpm and 300 g pressure.

These preparations may be observed under reflected and/or transmitted light, which is of critical importance in order to ascertain the optical properties of very small particles.

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A SURVEY OF CHEMICAL BONDING IN SILICATE
MINERALS BY X-RAY EMISSION SPECTROSCOPY: ERRATA

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Page 1303, the word gehlenite should be omitted from Fig. 5 caption.

Page 1306, line 37, should read: SiO bond stability.

Page 1309, line 1, should read: Figure 6.

REFERENCE

DODD, CHARLES G. AND G. L. GLEN (1969) *Amer. Mineral.* **54**, 1299.