

THE AMERICAN MINERALOGIST, VOL. 56, MAY-JUNE, 1971

THE USE OF POLYVINYL ACETATE IN THE PREPARATION
OF SCANNING ELECTRON MICROSCOPE MOUNTS OF SMALL
PARTICULATE MATERIALSR. M. McCANDLESS AND D. S. MCKAY, *National Aeronautics
and Space Administration Manned Spacecraft Center
Houston, Texas*

AND

G. H. LADLE, *Lockheed Electronics Co., Houston, Texas.*

ABSTRACT

The thermosetting plastic polyvinyl acetate used as a mounting medium holds sample firmly, minimizes wetting effects, and can be used for particles 1 μm and larger in size.

Polyvinyl acetate thermosetting plastic (PVA)¹ has been found to be a satisfactory mounting medium in the preparation of scanning electron microscope (SEM) mounts of particulate materials. For individual grains, this technique utilizes glass coverslips preheated to 300°C upon which minute drops of PVA are formed. A grain is contacted to the PVA and the mount removed to cool. For smaller particles (0.1 mm to 1 μm), a sample suspension in Freon is deposited on a thin film of PVA and the coverslip is momentarily reheated to permit anchoring of the particles. (Freon is used because it does not attack the PVA, and permits an even particle distribution.) SEM beam voltages greater than 7 kilovolts usually require a coating of gold or gold-palladium which is evaporated onto the specimen in a vacuum of 10^{-6} torr. After examination the specimens can be recovered and cleaned with a thorough washing in methyl alcohol.

The advantages of PVA over other mounting mediums (double adhesive tape, epoxy, *etc.*) (see references) include minimal wetting effects and the creation of a strong bond which prevents sample loss and permits ultrasonic cleaning of the mount.

REFERENCES

- DREW, CHARLES M. (1968) Chemical applications of the scanning electron microscope. *Proc. Symp. Scanning Electron Microscope: The Instrument and Its Applications*, p. 107-119.
- EADES, J. L., AND SANDBERG, P. A. (1969) Scanning electron microscope study of development and distribution of pore space in calcium oxide. *Proc. 2nd Ann. Scanning Electron Microscope Symp.*, p. 383-386.

¹ PVA Type AYAA, Union Carbide Corp. This technique was suggested by Dr. Malcolm J. Campbell of Cornell University.

- ELLIS, J. J., BULLA, L. A., JULIAN, G. ST., AND HESSELTINE, C. W. (1970) Scanning electron microscopy of fungal and bacterial spores. *Proc. 3rd Ann. Scanning Electron Microscope Symp.*, p. 147-149.
- PFEFFERKORN, G. E. (1970) Specimen preparation techniques. *Proc. 3rd Ann. Scanning Electron Microscope Symp.*, p. 91-96.
- RUSS, J. C., AND KABAYA, A. (1970) Preparation of samples for scanning electron microscopy. *Proc. Electron Microscopy Soc. Amer.*, p. 380-381.

THE AMERICAN MINERALOGIST, VOL. 56, MAY-JUNE, 1971

A LEVELING DEVICE FOR POLISHED MICROSECTIONS

G. J. JANSEN,¹ S. P. MANSFIELD,² AND G. MIEDL, *Republic Steel Corporation Research Center, Independence, Ohio.*

ABSTRACT

A simple, easily constructed leveler for polished microsections is described. In operation the leveler will maintain a microsection in sharp focus at 600X during automatic scanning.

A number of automatic microsection scanners for quantitative microscopy have been introduced in recent years including the Ameda manufactured by Gulton Femco, Inc. All scanners require section flatness and the surface being examined must be kept normal to the light beam, especially at high magnifications. These requirements are absolutely essential, notably so in the instance of the Ameda. Otherwise, during sample scan the image will go out of focus yielding erroneous results.

No commercially available leveler known to the writers will maintain a sample absolutely normal to the light beam and in crisp focus during an orthogonal scan of at least 25 mm in the "Y" direction and 15 mm in the "X" direction which are the normal requirements of an Ameda scan.

Therefore, the leveler shown in Figure 1 was designed and constructed from lightweight alloys. It consists essentially of a disk and hollow cylinder open at the top, each three inches in diameter and held together by a spring loaded screw through their axes. The basal surface of the disk is tapered six degrees from the perpendicular to the axis. Three 48-

¹ Present address: Climax Molybdenum Co., Extractive Metallurgy Laboratory, 5950 McIntyre Street, Golden, Colorado 80401.

² Present address: Republic Steel Corporation, Fayette National Bank Building, Uniontown, Pennsylvania 15401.