

trend indicates that condition number one is most likely met and background intensity can indeed be used to estimate total iron content in trioctahedral micas.

This background intensity method should be applicable to other mineral groups where isomorphous substitution of iron for another element with a much smaller mass absorption coefficient takes place. Nash (1964), in an X-ray study of the SiO₂ content of glasses, found a similar direct relationship between background intensity and total iron content of the glasses so isomorphous substitution may not even be necessary. It might also be possible to apply the same method to mineral groups where isomorphous substitution of two other elements with widely different mass absorption coefficients takes place.

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THE AMERICAN MINERALOGIST, VOL. 53, MAY-JUNE, 1968

A TECHNIQUE FOR MOUNTING, SECTIONING AND POLISHING
PARTICLES SMALLER THAN 30 MICRONS
IN DIAMETER¹

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Quantitative analysis of individual particles with the electron microprobe requires the creation of flat, well polished surfaces in order to reduce geometrical variations of X-ray absorption, surface charging and other phenomena observed when particles are mounted directly on surfaces. In our laboratory, particles as small as 8 μ in diameter are routinely prepared for reflected light microscopy and electron microprobe analysis by mounting them in bakelite plugs. We use a cover glass and an electron microscope grid to accurately determine the particle's position.

The particles selected for sectioning are transferred to a circular cover glass of the same diameter as the bakelite mold and a 100-mesh copper electron microscope grid is positioned over the particle. The grid may be tacked to the cover glass with a small drop of plastic cement. The cover glass is placed, with the particle up, at the bottom of the mold assembly of the bakelite press (a circular piece of thin cardboard may be placed

¹ Publication authorized by the Director, U. S. Geological Survey.

beneath the cover glass to reduce the possibility of breaking it). Bakelite powder (<200 mesh) is added, first gently to cover the particle and grid, then to fill the mold; and the bakelite plug is formed in the standard manner.

The bakelite plug is removed from the press and the cover glass removed from the surface of the plug. The particle is then in an accurately specified position marked by the electron microscope grid which has been molded into the plug. The particle, which had rested on the surface of the glass, now is just below the surface of the bakelite. The grid may be removed in order to eliminate stray light reflections; however, its impression will remain in the bakelite. Careful grinding and polishing using emery papers and diamond laps complete the process. The sample can then be analysed with the electron microprobe after a conducting surface, usually carbon, has been evaporated on the surface.

This technique has been applied to the preparation of meteoritic spherules from deep sea sediments ranging from 30μ to 8μ in diameter. It is possible to prepare even smaller particles, but the probability of losing particles increases. If more than half a spherule has been ground away, the remainder generally will pluck out of the bakelite and be lost. Epoxy resins may provide firmer binding for particles, but bakelite is a more convenient material for electron microprobe work as it is not rapidly disintegrated by an electron beam.

Parts of the technique described here have been used previously by various workers. We are indebted to our colleagues, E. J. Dwornik, M. H. Carr, and G. A. Desborough of the U. S. Geological Survey for suggested improvements in the mounting and polishing procedures.

THE AMERICAN MINERALOGIST, VOL. 53, MAY-JUNE, 1968

MAGNESIUM ALUMINUM CARBONATE HYDROXIDE TETRAHYDRATE:

A DISCUSSION

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A crystal structure has been proposed (Ross and Kodama, 1967) for synthetic $Mg_6Al_2CO_3(OH)_{16}\cdot 4H_2O$. This paper was submitted in July 1966, so that its authors were not acquainted with the structure determinations of the two forms of $[Mg_6Fe_2(OH)_{16}][CO_3\cdot 4H_2O]$, sjögrenite (hexagonal) and pyroaurite (rhombohedral), which have appeared since then Allmann and Lohse, 1966; Ingram and Taylor, 1967; Allmann, 1968).

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