

Application of Interactive Automated Image Analysis and Electron Microprobe Analysis to Geological Materials

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In August 1986 a JEOL 733 microprobe was installed at RPC. The microprobe was completely interfaced to a Kontron SEM/IPS automated image analyzer (AIA). The microprobe which is completely automated has four wavelength spectrometers, (WDS) and a Tracor-Northern energy dispersive spectrometer (EDS).

The unique feature of this system is the complete interfacing of the image analysis system with the microprobe. This configuration allows for images and spectral data produced by the electron microprobe to be acquired and processed by the image analysis system. The AIA can control the EDS operation, image acquisitions, X-ray mapping and stage position.

Most minerals can be distinguished from one another by their relative brights in a backscattered electron image (BEI). The AIA which discriminates phases according to their brightness (grey level) can classify a BEI of a polished thin section or grain mount into various mineral phases. Once this is accom-

plished various measurements can be made for each phase. For example: area, size, shape, orientation and liberation.

In some cases minerals have the same brightness in the BEI and they must be analyzed by either X-ray mapping of the entire field or by EDS analysis of individual particles. The spectral data can be combined with the image so that individual phases can be classified and their physical characteristics measured.

Low magnification images can be produced by storing adjacent images and putting them together as a mosaic. This is particularly useful when working with coarse-grained material such as potash ore.

This system has been used to determine the grain size distribution and liberation of mill products from several types of mines the modal analysis of ore and rock samples, and to search for gold in mill products and rock samples.

Several examples will be displayed at the poster session.