THE FIRST CANADIAN OCCURRENCE OF GEIKIELITE*

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Geikielite crystals up to 2 cm in size were found in the serpentine marble in the Maxwell Quarry, Wakefield, Quebec. Chemical analysis indicates the composition to be $(Mg_{0.77}Mn_{0.02}Fe^{2+}_{0.15}Fe^{3+}_{0.10})_{1.04}$ $Ti_{0.96}O_{3.00}$. *X*-ray single crystal and powder data were obtained.

*Paper by title.

ON THE SOLUBILITY OF ALBITE IN SUPERCRITICAL WATER

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The solubility of cleavage fragments of natural albite in distilled water was determined in large capacity (120 cc.) pressure vessels between 400 °C and 625 °C, and 400 to 3500 bars. In no part of this range does the dissolved material have the chemical composition of albite. The solubility of SiO_2 may be represented by

$$\log X = -1273/T + 2.24T/1000 - 4.564 + \log \sum_{n=0}^{8} (30.25/V)^n$$

where X is the number of mols SiO_2 per mol of water, T the absolute temperature and V the mol volume of water under the given conditions. The solubility of Na_2O and Al_2O_3 can be represented by

$$\log X = -1600/T + 1.27T/1000 - 4.122 + \log \sum_{n\ 0} (28.05/V)^n$$

The net result of prolonged treatment by supercritical water is the loss of SiO_2 relative to Na_2O and Al_2O_3. As a result nepheline is formed at 625 °C, and paragonite at lower temperatures. These facts may have geological significance. The solutions are stable at room temperature for extended periods, suggesting the formation of stable complexes. The silica is not in molybdate reactive form. Preliminary work on potash bearing feldspars does not disclose any common ion effect. These observations suggest that water reacts with alkali feldspars at elevated temperatures and pressures, and does not form true solutions.

EVALUATION OF INFRARED ABSORPTION SPECTROSCOPY FOR QUANTITATIVE ANALYSIS OF ROCKS

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To obtain modal analysis of rocks the technique most frequently used by petrologists is point counting. An instrumental technique, however, which a technician could perform would be most desirable. Infrared spectroscopy has been evaluated experimentally for this purpose.

The basis for infrared spectroscopy is the interaction between matter and infrared radiation. The record of this interaction is the infrared spectrum. Of the four types of infrared spectroscopy, absorption, reflection, attenuated total reflection and emission, the first-mentioned is most suited for quantitative analysis of rocks.

The instrumentation is sufficiently advanced for quantitative work. The sample preparation is rather long and, unless great care is taken, may include serious errors. The computation of results is tedious and may be inaccurate for the strongly absorbing complex silicates. Total time required for the entire analysis is 2½ hours, scanning each peak twice. Point counting two thin sections will also require two hours but a technician cannot usually do the work.

The most desirable technique for routine analysis of rocks by infrared absorption spectroscopy would use an internal standard. In spite of an extensive search no suitable standard was found, as most substances tried become unstable or react under the pressure required to produce the pellet necessary for the analysis.

Previous workers have shown that quantitative infrared absorption spectroscopy without an internal standard gives good results for a limited number of components or in certain specific fields of petrology. In spite of this it is concluded that with today's available techniques it is difficult to establish a practical infrared spectroscopic method for the routine modal analysis of all major constituents of rocks.

DETAILED PETROGRAPHY OF SOME LOWER ORDOVICIAN VOLCANIC ROCKS AROUND THE WHALESBACK MINE, NEWFOUNDLAND

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The rocks being studied lie around the Whalesback and Little Deer copper deposits on the Springdale Peninsula in Northern Newfoundland. These rocks are part of the Lush's Bight group of Lower Ordovician pillowed, basic volcanics which represent part of the early depositional phase in the development of the Appalachian mobile belt.

Because of extensive metamorphic alteration the rock types and the differences between rock types are very difficult to define. The chalcopyrite deposits show preferential development within one rock type but the relationships here are at present unclear.

It is hoped that the detailed petrographic and petrochemical work presently being carried out will shed some light on the nature and origin of the rocks and the relationships between the copper deposits and the host rock.

THE AGE OF ALKALINE AND CARBONATITE MAGMATISM IN ONTARIO AND QUEBEC

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A systematic study of the ages of alkaline rocks and carbonatite complexes in Ontario and Quebec has grown out of a comparative study of the argon retentivity of nepheline and other feldspathoidal minerals with biotite. Nepheline is found to be very suitable for dating by the K/Ar method and there is some indication that it gives even more reliable ages than biotite. All feldspathoidal rocks within the Grenville Province give ages in the range 855 to 1140 m.y. Nepheline syenites and carbonatites within the Superior Province fall into two age groups at approximately 1000 m.y. and 1700 m.y. Sodalite and cancrinite are of no practical value for K/Ar dating but are of considerable academic interest giving ages of up to 8500 m.y. indicating considerable excesses of radiogenic argon. Preliminary studies of scapolite suggest that it may also be a reliable mineral for K/Ar dating.

QUANTITATIVE DETERMINATION OF MONOCLINIC AND HEXAGONAL PYRRHOTITES BY X-RAY DIFFRACTION*

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Measurement of the difference in amplitude of components at about 51.75 and 51.40°2θ (Co $K\alpha$ radiation) of the asymmetric x-ray diffraction peak resulting from partial superposition of strong diffractions from corresponding planes in hexagonal and monoclinic

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*Paper by Title