

LOOMIS, A. A., *Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California*

Noritic Anorthosite Bodies in the Sierra Nevada Batholith

A group of small intrusive noritic plutons preceded emplacement of the immediately surrounding granitic rocks in a part of the composite Sierra Nevada batholith near Lake Tahoe. The norite and noritic anorthosite bodies are similar to some larger stratiform bodies in that (1) iron was strongly concentrated during the intrusive sequence, and (2) both Willow Lake type and normal cumulative layering are present. Pyroxenes are more ferrous in rocks late in the sequence, although most of the iron is in late magnetite which replaces pyroxenes. Cumulative layering is present but rare; Willow Lake layering is common and was formed early.

The Sierran rocks differ from those in stratiform plutons in that (1) the average bulk composition of all rocks is noritic anorthosite in which typical rocks contain 21 per cent Al_2O_3 , and (2) differentiation of both orthopyroxene and plagioclase produced a smooth progressive sequence of mineral compositions. A plot of modal An vs. En for all the rocks in the sequence from early Willow Lake type layers to late norite dikes defines a smooth trend from $\text{An}_{88}\text{-En}_{12}$ to $\text{An}_{44}\text{-En}_{56}$. The ratio An/Ab decreased faster than En/Of until the assemblage $\text{An}_{65}\text{-En}_{35}$ was reached and En/Of began to decrease more rapidly.

Similar plots for large stratiform bodies show too much scatter to define single curves. In the Sierran rocks, minerals which are found together crystallized together, and remained together during final emplacement. Large stratiform bodies contain early, cumulative mineral assemblages which, because of extensive convection or other mass movement, did not crystallize together. The stratiform bodies probably cooled more slowly but contained pressure, temperature, and concentration gradients which caused the apparent disequilibrium cumulative assemblages.

MANDARINO, J. A., *Royal Ontario Museum, Toronto, Canada*, S. J. WILLIAMS, *Scott Williams Mineral Co., Inc., Scottsdale, Ariz.*, AND R. S. MITCHELL, *University of Virginia, Charlottesville, Virginia*

Spiroffite, a New Tellurite Mineral from Mexico

Spiroffite, $(\text{Mn,Zn})_2\text{Te}_3\text{O}_8$, discovered near Moctezuma, Sonora, occurs as small cleavable masses and has a hardness of about $3\frac{1}{2}$. The luster is adamantine and the color varies from red to purple. The density is 5.01 ± 0.02 . Spiroffite is biaxial positive with $2V = 55^\circ \pm 5^\circ$, $\alpha = 1.85 \pm 0.01$, $\beta = 1.91 \pm 0.01$, $\gamma > 2.10$.

X-ray investigations show that the mineral is monoclinic with space group *Cc* or *C2/c*. Unit cell values are: $a = 13.00 \text{ \AA}$, $b = 5.38$, $c = 12.12$, $\beta = 98^\circ$, with $Z = 4$. Strongest x-ray spacings are: 4.98 \AA (strong+), 3.00 (strong+), 4.06 (strong), 3.31 (strong), and 1.63 (medium strong).

A chemical analysis of 500 mg yielded the following data: TeO_2 75.93%, MnO 14.13%, ZnO 9.32%, CaO 0.15%, remainder 0.53%, total = 100.06%. The remainder includes: insoluble 0.22%, CdO 0.07%, PbO 0.05%, MgO 0.02%, Bi_2O_3 0.08%, Sb_2O_3 0.02%, Al_2O_3 0.02%, CoO 0.02%, and H_2O 0.03%. The empirical formula derived from these data is: $(\text{Mn}_{1.26}\text{Zn}_{0.72}\text{Ca}_{0.02})\text{Te}_{3.01}\text{O}_{8.02}$.

Spiroffite is associated with tellurite, paratellurite, native tellurium, and several other new tellurites. The mineral is named in honor of Kiril Spiroff, Professor of Mineralogy at the Michigan College of Mining and Technology, Houghton, Michigan.