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MINERALOGICAL NOTES

METASTIBNITE FROM THE GEYSERS, SONOMA COUNTY, CALIFORNIA

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ABSTRACT

Metastibnite has been confirmed from The Geysers, Sonoma County, California.

During the period 1955–1957 considerable development work was carried out at The Geysers, Sonoma County, California by the Pacific Gas and Electric Company. Bulldozing operations through a bank of siliceous sinter near the eastern edge of the property revealed rocks stained red by what was thought to be cinnabar. The material (exact source unknown) was subsequently examined and found to be Hg-deficient but Sb-rich, and tentatively identified as metastibnite and sold commercially under that name by Minerals Unlimited, Berkeley, California; although the possibility that the material might be cinnabar-coated stibnite or some other Sb-rich material was not considered. The author collected several samples of this "metastibnite" in 1957–1958 but has only recently investigated it in any detail.

The red material occurs as coatings in cracks in siliceous sinter but nowhere is observed to form a complete vein. Further, the material is apparently restricted to this one small area at The Geysers (on the extreme eastern edge of the property known as the Big Geysers approximately 50 yards north of Big Sulphur Creek). The reader is referred to Vonsen (1946), McNitt (1968), and Koenig (1969) for more details concerning the area.

The red material was carefully scraped from the sinter, but 100 percent purity could not be obtained. Emission spectrographic analysis of the material yielded 60 weight percent Sb but only 0.2 to 0.5 weight percent Hg. Analysis of synthetic Sb_2S_3 yielded 70.5 percent Sb, close to the theoretical value of 71.7 (see Clark, 1970). The analyses are accurate to ± 3 percent of the reported values. The presence of some SiO_2 was noted in the unknown and probably accounts for the low Sb content.

X-ray diffraction study of the material reveals it to be largely amorphous; less than 1 percent of cinnabar and beta-cristobalite (?) are present. No peaks indicating the presence of stibnite or any other Sb mineral were observed.

I conclude that the red material is indeed metastibnite, and that The Geysers is the second location in the United States where this rare mineral is found, the other being Steamboat Springs, Nevada, where both metastibnite and stibnite occur in association with Hg and As minerals.

The conditions necessary for the formation of metastibnite are not clear. Clark (this issue) attributes formation of metastibnite at Mina Alacrán, Copiapó, Chile to oxidation from stibnite, but the metastibnite found at The Geysers and at Steamboat Springs may be primary (see White, 1967; for a discussion of the geochemistry of the waters of both locations). Sulfur isotopic analyses (Geochron Laboratories, Cambridge, Massachusetts) yield the following information for sulfur-bearing species from the metastibnite location at The Geysers: metastibnite; $\delta S^{34} = -6.7$ °/₀₀; cinnabar, +2.3 °/₀₀; native sulfur, −2.9°/₀₀; and sulfate (boussingaultite plus unidentified material), −0.9 °/₀₀. These data suggest that a gas phase, probably H_2S, is involved in the formation of primary metastibnite because its sulfur is appreciably lighter than the S of the other species. This explanation would also account for its occurring as coatings in cracks but not as complete veins.

References

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SUPERGENE METASTIBNITE FROM MINA ALACRÁN, PAMPA LARGA, COPIAPÓ, CHILE

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Abstract

Metastibnite is confirmed as an oxidation product of stibnite in the Alacrán deposit. Electron microprobe analysis yields a composition close to stoichiometric Sb_2S_3, but with a slight sulfur-deficiency.

Although the status of the rare mineral, metastibnite, as amorphous red Sb_2S_3 is generally accepted (*e.g.* Palache *et al.*, 1944; Hey, 1955), there appear to have been no quantitative analytical studies since the investigations of Davy (1920) and Lindgren and Abbott (1931).