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THE DISCREDITATION OF PLATYNITE

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ABSTRACT

Platynite, formerly considered as a valid mineral species from Falun, Dalecarlia, Sweden, is discredited as being a mixture of laitakarite and selenian galena. The discreditation has been approved by the IMA Commission on New Minerals and Mineral Names.

Keywords: platynite, discreditation, laitakarite, selenian galena, Falun, Sweden.

SOMMAIRE

Cette note annonce la discréditation de la platynite, considérée jusqu'ici une espèce minérale valide provenant de Falun, Dalecarlia, en Suède. Il s'agit en fait d'un mélange de laitakarite et de galène sélénifère. La discréditation a été approuvée par la Commission des nouveaux minéraux et des noms de minéraux de l'IMA.

Keywords: platynite, discréditation, laitakarite, galène, Falun, Suède.

INTRODUCTION

A new mineral species from the Falun copper mine, Dalecarlia (Dalarna), Sweden, was described by Flink (1910) and named platynite (platynit in Swedish; from Greek πλατυνειν, to broaden). The true nature of this mineral, often given as $PbBi_2(Se,S)_3$, has been a long-standing enigma. In the present note we show, on the basis of a careful investigation of Flink's type material, that platynite should no longer be considered as a valid mineral species. It is simply a mixture of two well-known minerals, namely laitakarite and galena. The discreditation has been approved by the IMA Commission on New Minerals and Mineral Names.

THE TYPE MATERIAL

According to Flink (1910), there were three specimens available at the time of his description, and one of them was sacrificed for the wet-chemical analysis. The two remaining samples have been traced in the mineral collection of the Swedish Museum of Natural History (catalogue numbers g991 and g4008). The attached labels clearly state "Platynit. Originalmaterial." in Flink's own hand-writing. The samples match the original description very well. The rock matrix consists of dark quartz mixed with a chlorite-group mineral. Chalcopyrite appears as an accessory phase. Platynite is a black to steel gray material with a metallic luster. It appears as thin plates or bladed masses. The basal cleavage is very good, but individual crystal faces cannot be discerned. The Mohs hardness was estimated at 2–3, and the measured density is 7.98 $g.cm^{-3}$ according to Flink (1910). The chemical analysis, carried out by R. Mauzelius, yielded (all in wt.%) Bi 48.98, Pb 25.80, Cu 0.32, Fe 0.30, S 4.36, Se 18.73, not dissolved 0.36, sum 98.85.

PRESENT INVESTIGATION

Platynite from both samples was subjected to an X-ray powder-diffraction analysis using an automated diffractometer. The data indicate a mixture of a tetradymite-type mineral (*i.e.*, a phase structurally related to the tetradymite-group minerals; *cf.* Bayliss 1991) and galena. Polished mounts of #g4008 were prepared, and observed under the polarizing microscope (reflected light). The two major opaque phases seen are intimately intergrown (Fig. 1). Galena is recognized as isotropic, bluish white lamellae up to 30 μm in width. The second dominant mineral is anisotropic and strongly bireflectant. Preliminary energy-dispersion micro-analysis

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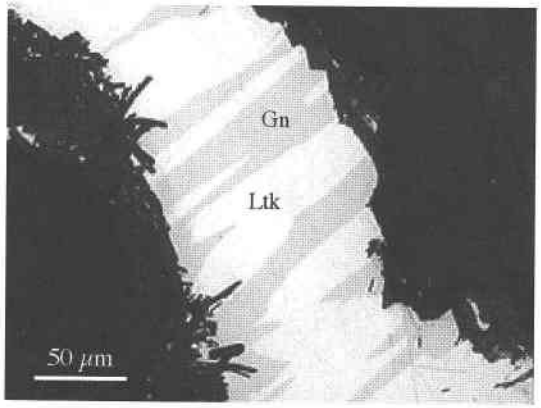

FIG. 1. Intergrown laitakarite (Ltk) and galena (Gn) in sample #g4008 (reflected, polarized light), previously considered to be "platynite".

showed it to be a selenide of Bi with some S. The chemical, structural and optical data suggest this phase to be laitakarite [trigonal $Bi_4(Se,S)_3$]. Minute (≤10 μm) grains of native bismuth occasionally occur close to the contacts with quartz.

To verify the identity of laitakarite and check its homogeneity, further analyses were carried out using a Cameca SX–50 electron microprobe, operated at 20 kV and 15 nA. The following standards were used: ZnS (S*K*α), Bi (Bi*M*β), Se (Se*K*α) and vanadinite (Pb*L*α). Results from 12 randomly selected points in a polished section are given in Table 1; Fe, Cu and Sb were found to be below the limit of detection. The data show that the mineral has the correct stoichiometry within the expected limits of error (±2%), and there is a slight variation related to S–Se substitution. The composition of the coexisting galena is approximately $Pb(S_{0.55}Se_{0.45})$.

DISCUSSION

It is most likely that the two specimens remaining are similar to the material consumed during Flink's investigation. Clearly, a mechanical mixture of laitakarite (*ca.* 70%) and galena (*ca.* 30%) would approximately correspond to platynite in composition. Such a composite is also expected to have a density around 8.0 $g.cm^{-3}$, in good agreement with the original data. The presence of laitakarite was earlier reported from Falun by Karup-Møller (1970).

Bayliss (1991) suggested, merely on the basis of literature data, that platynite could be a plumbian sulfurian nevskite (ideally BiSe). There is presently no support for this suggestion.

CONCLUSION

The type material consists of laitakarite and Se-rich galena (*i.e.*, a solid solution between galena and clausthalite), and platynite thus is not a valid species. Even if a mineral with a composition close to "platynite" were to occur in nature, it should be given a new name. The existence of such a substance was in fact indicated by data published by Nikitin *et al.* (1989). The X-ray powder-diffraction pattern of their material could not be matched with any known mineral, and possibly represents a new species.

TABLE 1. ELECTRON-MICROPROBE DATA ON LAITAKARITE*, FALUN, SWEDEN

	wt.%											mean	σ
Bi	76.16	76.05	76.20	76.39	76.18	76.76	76.11	76.12	76.99	76.78	76.31	75.96	76.33	0.32
Pb	3.41	3.05	3.25	3.06	2.86	3.44	3.14	3.00	2.89	3.43	3.38	3.31	3.20	0.21
Se	16.93	16.45	16.60	17.07	16.96	17.22	17.05	17.02	17.10	16.75	17.19	17.23	16.96	0.24
S	2.32	2.37	2.41	2.21	2.26	2.00	2.15	2.11	2.05	2.12	2.12	2.17	2.18	0.13
Total	98.82	97.92	98.46	98.73	98.26	99.42	98.45	98.25	99.03	99.08	99.00	98.67	98.67	
	formula proportions (7 atoms)													
Bi	3.82	3.85	3.83	3.85	3.85	3.87	3.85	3.86	3.89	3.88	3.84	3.82	3.85	0.02
Pb	0.17	0.16	0.16	0.16	0.15	0.18	0.16	0.15	0.15	0.17	0.17	0.17	0.16	0.01
Se	2.25	2.21	2.21	2.27	2.27	2.30	2.28	2.29	2.29	2.24	2.29	2.30	2.27	0.03
S	0.76	0.78	0.79	0.72	0.74	0.66	0.71	0.70	0.67	0.70	0.69	0.71	0.72	0.04
Se + S	3.01	2.99	3.00	2.99	3.01	2.96	2.99	2.99	2.96	2.94	2.98	3.01	2.99	0.02

*sample #g4008.

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