Oldhamite CaS and potencially new mineral $CaCu_2S_2$ from pyrometamorphic rock of the Hatrurim formation

E. GALUSKIN[1], I. GALUSKINA[1], YE.VAPNIK[2], M. MURASHKO[3], K. PRUSIK[4] AND P. DZIERŻANOWSKI[5]

[1]Faculty of Earth Sciences, Department of Geochemistry, Mineralogy and Petrography, University of Silesia, Będzińska 60, 41-200 Sosnowiec, Poland (*correspondence: evgeny.galuskin@us.edu.pl)
[2]Department of Geological and Environmental Sciences, Ben-Gurion University of the Negev, POB 653, Beer-Sheva 84105, Israel
[3]Systematic Mineralogy, 44, 11th line V.O, apt. 76, Saint-Petersburg 199178, Russia
[4]Institute of Materials Science, University of Silesia, 75 Pułku Piechoty 1A, 41-500 Chorzów, Poland
[5]Institute of Geochemistry, Mineralogy and Petrology, Warsaw University, al. Żwirki i Wigury 93, 02-089 Warszawa, Poland

Oldhamite is widespread mineral of spurrite, larnite and apatite-calcite pyrometamorphic rocks of the Hatrurim formation. Pyrometamorphic rocks of the Hatrurim formation („Mottled Zone") are located along the framing of the Dead Sea transform fault on the territory of Israel, Jordan and Palestine [1]. Oldhamite shows stable composition close to stoichiometric formula CaS. Oldhamite rarely occurs in larnite rocks enriched with copper sulphides. Larnite, brownmillerite, fluorellestadite, ye'elimite, new mineral - nabimusaite $(K,Ba)Ca_{12}(SiO_4)_4(SO_2)_2(O,F)_3$ [2] and potencially new minerals of mayenite supergroup of the series $Ca_{12}Al_{14}O_{32}F_2$ - $Ca_{12}Al_{14}O_{32}[F_2(H_2O)_4]$ [3] are the main minerals of these rocks. Periclase, vorlanite $CaUO_4$ and new phase Ca_3UO_6 are noted as accessory minerals. In one case oldhamite was detected as inclision in chalcocite. Around oldhamite a phase with empirical crystal chemical formula $Ca_{0.99}Cu_{2.02}S_{1.98}$ forms. EBSD and Raman studies showed identity of this phase to the synthetic thiocuprate $CaCu_2S_2$ [4].

[1] Gross, S. (1977) Israel. *Geol. Surv. Isr. Bull.*, **70**, 1-80. [2] Galuskin, E.V. *et al* (2013) *MinMag.*, **77**, 1-12. [3] Galuskin, E.V. *et al* (2012) *Abstr. Eur. Min.Conf.*, 1, EMC2012-54-2. [4] Purdy A.P. (1998) *Chem.Mater.*, **10**, 692-694.

Potential new minerals $Ba_3(VO_4)_2$ and hexagonal $BaAl_2Si_2O_8$ from rocks of the Hatrurim formation

I. GALUSKINA[1]*, YE. VAPNIK[2], K. PRUSIK[3], P. DZIERŻANOWSKI[4], M. MURASHKO[5] AND E. GALUSKIN[1]

[1]Univ. of Silesia, Będzińska 60, 41-200 Sosnowiec, Poland (correspondence: irina.galuskina@us.edu.pl)
[2]Ben-Gurion Univ. of the Negev, P.O.B. 653, Beer-Sheva 84105, Israel
[3]Inst. of Materials Sciences, Univ. of Silesia, 75 Pułku Piechoty 1A, 41-500 Chorzów, Poland
[4]Warsaw Univ. al. Żwirki i Wigury 93, 02-093 Warszawa, Poland
[5]Systematic Mineralogy, 44, 11th line V.O., apt.76, Saint-Petersburg 199178, Russia

Two potentially new mineral species with the end-member crystal chemical formulae $Ba_3(VO_4)_2$ and $BaAl_2Si_2O_8$ were detected in vein-like bodies of paralavas composed by coarsed-graned aggregates of rankinite, melilite, pseudowollastonite, schorlomite, fluorapatite, magnetite hosted by melilite hornfels. These rocks are confined to pyrometamorphic rocks of the Hatrurim formation in the Negev Desert, Israel [1]. Ba-minerals being in association with $Ba_3(VO_4)_2$ and $BaAl_2Si_2O_8$ are represented by the following mineral species: barioferrite $BaFe_{12}O_{19}$, barite $BaSO_4$, walstromite $BaCa_2(Si_3O_9)$ and the next potentially new minerals of the $BaCa_6[(SiO_4),(PO_4),(VO_4),(SO_4)]_4F$ series. The studied minerals show similar characteristics, for example EBSD patterns and Raman spectra (Fig. 1), as their well-known synthetic analogous [2, 3].

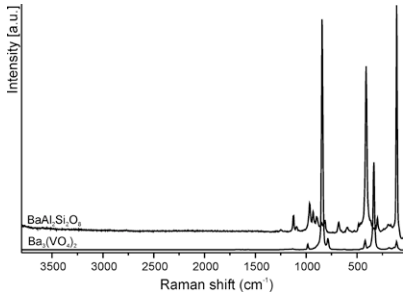

Figure 1: Raman spectra of two potentially new Ba-minerals.

[1] Gross (1977) *Geol. Survey of Israel Bul.* **70**. [2] Grzechnik & McMillan (1997) *Solid State Com.,* **8**, 569-574. [3] Kremenović *et al* (2003) *J. Phys. Chem. Solids*, **64**, 2253-2268.

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