Paper Number: 2918

An overview on new platinum-group minerals and their synthetic analogues

Vymazalová, A. [1], Laufek, F. [1], Drábek, M. [1]

[1]Czech Geological Survey, Prague, Czech Republic, anna.vymazalova@geology.cz

---

Platinum-group minerals (PGM), their physical and chemical properties, including their occurrence and localities were summarized in [1,2]. Later, all PGM recognized by the Commission on New Minerals, Nomenclature and Classification (CNMNC) of the International Mineralogical Association (IMA), listed in alphabetical order and providing all pertinent information were summarized by [3]. In 2002 there were 109 PGM known. Since then, according to our best knowledge additional 22 new PGM were described and approved by CNMNC IMA. Among the recently described 22 PGM, 17 are Pd-dominant, 3 Pt-dominant and 2 Rh- dominant. Ten minerals were named for a person prominent in the field of mineralogy, 10 for the geographical locality of its occurrence and 2 for a particular property of the mineral (chemical composition). The synthetic analogues applicable in the description of PGM were applied on the following mineral species: milotaite, pašavaite, zaccariniite, lukkulaisvaaraite, kojonenite, palladosilicite and norilskite.

In most cases the small size of natural grains, their intergrowths with other PGM, mostly embedded in sulphides, prevented the extraction and isolation in an amount sufficient for crystallographic and structural investigations. Therefore these investigations were performed on synthetic material. The silica-glass tube method, using high-purity elements as starting material, was used for the synthesis of $Pd_3Pb_2Te_2$ (pašavaite), Pt_2HgSe_3 (jacutingaite), RhNiAs (zaccariniite), $Pd_{14}Ag_2Te_9$ (lukkulaisvaaraite), $Pd_{7-x}SnTe_2$ (kojonenite), $(Pd,Ag)_{2-x}Pb$ (norilskite). Experimental runs were (after melting and homogenization) heated from several weeks to months at temperatures 300-600°C.

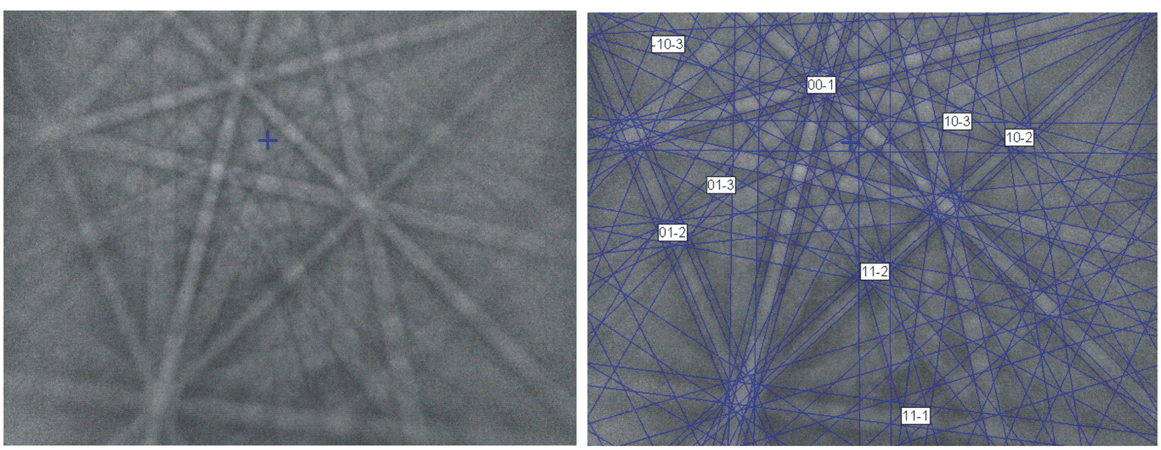

Figure 1: EBSD image (the Kikuchi bands) of natural jacutingaite, patterns generated from the structure of synthetic Pt_2HgSe_3; in the right column the Kikuchi bands are indexed

Chemical identity, optical and physical properties confirmed the correspondence between natural and synthetic materials. Electron back-scattering diffraction (EBSD) study was applied to support the structural identity, Fig.1. Raman spectroscopy is also a supportive tool to prove the structural identity and was applied in the description of zaccariniite.

References:

[1] Cabri LJ (1981) CIM Special vol 23: 136-138

[2] Cabri LJ and Laflamme JHG (1981) CIM Special vol 23: 151-173

[3] Cabri LJ (2002) CIM Special vol. 54: 13-129