Podiform chromitites from the Turkish ophiolites: An overview to the mineralogy of Platinum-group elements

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Podiform chromitites of Mesozoic ophiolites of the Western Mediterranean Tethys represent a major source of chromium, and are considered a potential target for platinum group elements (PGE) exploration. Turkey is one of the major chromite producers in the world, ranking 4th in exports. Most of the Turkish chromitites occur in the mantle tectonite unit of supra-subduction zone ophiolites. In this contribution we have summarized the results of investigation obtained on several Turkish Cr- and Al-rich podiform chromitites [Muğla (SW Turkey), Eskişehir, Bursa (NW Turkey), Kop Mountains (NE Turkey), Kahramanmaraş, Malatya, and Gaziantep (SE Turkey)] with special regard to their mineralogy of platinum group elements (PGE). About 450 PGM grains, generally less than 15 μm in size, have been identified in all the investigated chromitites. They occur in fresh (84%) and altered chromite crystals (6%), along cracks and fissures (8%) of the chromite and, rarely, in the silicate matrix (2%) generally composed of secondary silicates, such as chlorite and serpentine. The PGM form single phase crystals or they are part of polyphasic grains composed of other PGM, base metals sulphides and silicates. The PGM containing IPGE (Os, Ir, Ru) are the most abundant phases (96% of all PGM) compared to the PPGE (Rh, Pd, Pt) bearing PGM (4%). The IPGE bearing PGM are composed of laurite-erlichmanite serie (74%), native osmium (8%), unidentified Ru-Fe phases (6%), native iridium (4%), irarsite (3%), unidentified Ir phases (2%) and native ruthenium (1%). Very rare (up to 2%) kashinite, cuproiridsite, ruarsite, and unidentified Os phase have also been identified. A total of 20 grains of PPGE phases have been found in all the localities, and most of them are Pt-Fe alloys (40%), accompanied by platinum (20%), hollingworthite (20%) and unidentified Pt (10%), Rh (5%) and Pd (5%) phases. These results confirm a strong predominance of PGM containing IPGE over PPGE, as typical for mantle hosted ophiolitic chromitites.