

Distribution of platinum-group elements (PGE) in chromitites of Sabzevar, NE of Iran

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Abstract: The chromitite ores of Sabzevar ophiolitic zone could be divided into two groups of high Cr and high Al. The concentration of Cr₂O₃, As, S and some heavy metals (Cu, Ni, Ag, Co, Zn) is higher in high Cr samples; while high Al chromitites show higher concentration of Al₂O₃, SiO₂, TiO₂ and other trace elements. The high Cr chromitites have higher PGE than Al-rich samples and PGE concentration increases with Cr₂O₃. The high Cr chromitites have fractionated PGE chondrite-normalized patterns with negative slope (Pd/Ir = 0.25) and high IPGE/PPGE (average 6.22); while high Al chromitites show unfractionated and relatively flat patterns (Pd/Ir = 1.9, IPGE/PPGE = 2.88). The PGE composition of high Cr chromitites indicates they are formed by high degrees of partial melting (boninitic melt) in arc setting. In contrast, Al-enriched samples have been produced by low degrees of partial melting (toleitic melt) beneath spreading centers (i.e., mid-ocean ridges or back-arc basins). The results of PGE composition of Sabzevar chromitites are coincident with chemical composition data of chromite crystals in these samples.

Keywords: *chromitite; platinum-group elements (PGE); boninitic melt; toleitic melt; sabzevar.*

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