

Mineralogy, geochemistry and industrial applications of Chah Yabu and Cheshmeh Palang chromite deposits of Sabzevar Ophiolites (NE, Iran)

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Abstract: The investigated area is a part of Sabzevar ophiolite melang of North Eastern Iran which is important from two points of view, geology and its potential of Economic Mineral deposits. The main geological units in both Chah Yabu and Cheshmeh Palang areas are serpentinized peridotite, gabbro, diabasic dykes of Upper Cretaceous and Tertiary volcanic rocks which are mainly altered. Cheshmeh Palang area contains more harzburgite and less dunite units than Chah Yabu. Reflected light microscopy investigations indicate that chromite ores in both Chah Yabu and Cheshmeh Palang deposits show primary and secondary textures. The major primary textures are massive, banded, disseminated, and integrated while the main secondary textures are cataclastic and pull-apart. Geochemical analysis show that chromite ores of Chah Yabu and Cheshmeh Palang deposits have average amount of Cr₂O₃ 53.15% and 42.93%, Al₂O₃ 6.15% and 8.92%, MgO 15.92% and 22.42% and TiO₂ 0.14% and 0.19% respectively. The ratio of [Cr/(Cr + Al)] in Chah Yabu and Cheshmeh Palang chromite deposits are more than 0.91% and 0.76% respectively which are demonstrating these deposits of high chromite and low aluminum types. High amount of Cr₂O₃ and MgO and also low amount of Al₂O₃ and TiO₂ from chromite ores correspond to deep stratigraphic situation of their ore bodies in ophiolitic sequence (tectonized peridotite) and indicates that the parent magma for both of Chah Yabu and Cheshmeh Palang deposits were primary melting materials from upper mantle. Regarding the standard chemical properties of chromite to be used in ferrochrome production and chemical industries (Cr₂O₃>46% .Cr/Fe>3 and Cr₂O₃>44%, Cr/Fe>1.5) respectively, chromite ores from Chah Yabu and Cheshmeh Palang deposits can be used mainly for metallurgical and chemical applications.

Keywords: *Sabzevar ophiolite; Chah Yabu; Cheshmeh Palang; metallurgy; chemical industries.*

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