

Petrology of the chromite bearing ultramafic rocks in Allai area of Kohistan, Pakistan

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The Allai area of Kohistan (AAK), Khyber Pakhtunkhwa province of Pakistan comprises ophiolitic mélangé of the Main Mantle Thrust (MMT), hosting rocks of the Indian continental plate and the Neotethyan oceanic crust. To the north of the MMT lies the Kohistan Island Arc and to the south the Indian continental plate. The present research study deals with metallic mineral prospecting for chromite in the area of investigation. Based on fieldwork and laboratory data including petrography, XRD and XRF analyses, the rocks of the area are identified as dunites, pyroxenites, serpentinites, meta-gabbros and meta-basalts. The rocks clearly show deformation in terms of shearing, mylonitization and anastomosis, due the tectonic activity. Besides other mineral constituents, the presence of alkali amphibole in meta-basalts may corroborate alkaline affinity of the rocks or the presence of blue schist in the mélangé zone. Geochemistry shows that mafic rocks of the area are tholeiitic and the ultramafics rocks as cumulates. There seems single magmatic source composition for the mafic and ultramafic rocks. On the basis of major elements chemistry tectonic division, the meta- gabbroic rocks show (Mid-Ocean Ridge Basalt) MORB affinity. The chromite mineralization is restricted to dunites only, which form in layers, and as disseminated and fracture-filled grains. The fracture-filled grains are secondary whereas layering and dissemination is primary, related to magmatic crystallization. The XRF analysis reveal 18 wt.% chromium in one rock, which is not economically viable. Further detailed field and laboratory study is suggested to find out economic potentiality of chromite and other metallic minerals in the area.