

Pan African (Proterozoic) chromite deposits and associated ultramafic rocks in the Eastern Desert of Egypt

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In Egypt, an igneous and metamorphic complex of Precambrian age covers widely area in the Eastern Desert and South Sinai, and limited areas in the south Western Desert. The chromite deposits of Egypt are common member of ophiolites of the complex. Small and irregular masses of podiform chromites are mainly frequent in the central and southern parts of the Eastern Desert. Some of these chromites have different textures, inclusion mineralogy and chemical characteristics which may be reflected by different conditions of the chromite formation. Our preliminary data indicate no differences in mineralogy from Phanerozoic ophiolites.

There are numerous mafic-ultramafic masses of Pan African age in NE Africa and Saudi Arabia that lie within several, broad, discontinuous NW-SE belts. In all cases examined, these masses have mechanically external contacts with the Pan-African rocks already described. These ultramafic bodies account for 5.3 % of all Precambrian outcrops in the Eastern Desert of Egypt. Chromite deposits of Egypt are commonly hosted by serpentinized ultramafic rocks widely distributed in the central and southern Eastern Desert of Egypt. Many occurrences of chromite deposits are known : a) Central Eastern Desert: Gebel El Lawi, Wadi El Zarka, Wadi Um Huitate, Wadi Bezah, El Barramyia, Gebel El Rabshi, etc., b) Southern Eastern desert; Abu Dahr and El Gallala. The ultramafic rocks outcropping within the studied areas have been heavily altered into serpentinite, talc carbonate and ultramafic schists. Field and petrographic investigations indicate rarely preserve primary textures and silicate minerals of peridotites, except only one locality (Abu Dahr area, south Eastern desert) where we could observe primary textures of the host ultramafic rocks.

The chromite deposits of Egypt in most cases occur mainly as lenticular bodies of variable sizes generally less than 30 m long. Different ore types have been described including massive ore, disseminated ore and grape to pocket ore. The characteristics of these ore deposits varied from one locality to another in the texture, degree of alteration and chemical composition of spinel. Even in the same locality, the massive ore has different chemical character compared with the disseminated ones. The chemistry of chromian spinel is widely varied from locality to locality partly depending on the degree or grade of alteration or metamorphism. Our preliminary data indicate that the Cr/(Cr+Al) atomic ratio of spinel is up to 0.8 in chromitites and around 0.5 in peridotites for the least metamorphosed samples. This characteristic is almost similar to that of the Phanerozoic ophiolites.