Micro-texture and mineralogy of Fe-Ti oxides from Qareaghaj mafic-ultramafic intrusion, NW Urmia

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Abstract: Detailed studies on micro-texture and microprobe analysis of Fe-Ti oxides from Qareaghaj mafic-ultramafic intrusion (QMUI) is the basis of this investigation. The QMUI is mainly composed of non-mineralized mafic and Fe-Ti-P-rich ultramafic rocks (FTP). The FTP with high proportion of ilmenite (~11-19 modal %) and magnetite (~2-13 modal %) show an unusual bulk composition. Fe-Ti oxides are divided into three distinct generations on the basis of their micro-texture: 1) small-sized rounded to ellipsoid-shape inclusion in olivine and clinopyroxene, 2) coarse interstitial grains and 3) late stage veinlets. The ilmenite grains (0.1-2mm) commonly contain fine hematite lenses arranged in [0001] planes. Primary Ti-magnetites contain ilmenite lamellae along the [111] planes and exhibit wide variety of exsolution textures (e.g., trellis- and sandwich-types). Ilmenite in FTP show Xilm range from 0.82-0.91 and has high MgO (0.82-2.38 wt %). Most Ti-magnetites (bulk composition) have low Xusp (0.03-0.13) and therefore high Xmag (0.79-0.93). Two oxide geothermobarometer in the ILMAT program, resulted in re-equilibration temperature range of 450-700°C and fO2 (nearly -19±3) during subsolidus cooling for FTP rocks.

Keywords: Qareaghaj, Ilmenite, Magnetite, FTP rocks.