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Microstructure and geochemistry of the oceanic mantle lithosphere in Khoy ophiolites, NW of Iran

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Petrofabric and geochemical analysis of the huge mantle section in the Khoy ophiolitic complex (NW of Iran), suggest that ultramafic tectonites include a low-temperature NW-SE shear zones cut across the high-temperature NE-SW mantle flow direction. As a result, microstructures record a fabric transition from oblate and oblong porphyroclastic textures in a mantle sections to mylonitic textures in the shear zones. The study of olivine LPO patterns in high-T samples of mantle show slip on the (010) [100] and (0kl) [100] high-temperature low-stress systems (up to 1000^{oc}). The low-T olivine LPO patterns within the shear zones indicate the gliding along (001) [100] low-temperature slip system (800-900^{oc}). These LPO patterns and also the well-developed S-C fabric indicate dextral shearing on the shear zones. The olivine LPO patterns become weaker with progressive mylonitization and accompanying dynamic grain size reduction. In despite of the dominant olivine LPO patterns during peridotite deformation varying from (010) [100] in tectonites to (001) [100] in mylonites within the shear zones, the [010]-axis remain consistently sub-vertical in both cases. These observations suggest that the mantle fabrics have been re-evolved in shear zones, without disruption of primary olivine LPO patterns. Spinel grains in these tectonites show highly variable Cr-number (between 10 to 90 wt %) while their Mg-number varies between 50 and 90 wt %. Therefore we distinguished two types of spinel, (I) the grains with high-Cr content and (II) the grains with high-Al content. Fo percentage of olivines is about 90%. Opxs are rich in Al and Cr and enstatite in composition while Cpxs are rich in Cr and are essentially alumina-chromian diopside in composition. These dextral shear zones are inferred to have resulted from initial stage of detachment in oceanic environment and thrusting. A partial melting would be resulted from this detachment phase and developments of these shear zones. The resulted basaltic melt has

produced high-Al spinels (type II) and also Cr-bearing Cpxs.

Keywords: Khoy ophiolitic complex; Mantle fabric; Shear zones; Lattice preferred orientation (LPO); Slip system