

Structural analysis, origin and deformation conditions of ductile shear zones in Dehnow Granitoid Pluton – west of Mashhad

B. Rahimi*¹, H. Alizadeh

1-Department of Geology, Faculty of Sciences, Ferdowsi University of Mashhad

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Abstract: The Mashhad ophiolitic and metamorphic complex was intruded by Mashhad granitoids during different episodes of magmatism. Dehnow pluton with diorite-granodiorite composition was intruded at earliest stage of magmatism during Late Triassic (Norian, 215 ± 4 My). This pluton is cut by the NW-SE trending ductile shear zones which are dominated by an intense ductile deformation. The rocks of Dehnow pluton along the shear zones are converted into protomylonite, mylonite and ultra-mylonite with steeply dipping mylonitic foliation and gently plunging stretch lineation on it. Kinematic analysis of shear sense indicators such as S-C fabrics, asymmetric folds, asymmetric porphyroclasts, mica fish and domino-type fragmented porphyroclasts reveal that the ductile deformation is related to right lateral reverse slip that may describe by a transpressional deformation regime. The minerals in the mylonitic rocks show variable microstructures such as patchy to crosshatch undulose extinction, shear fracture, deformation lamellae, subgrains formation, bulging dynamic recrystallization (BLG) and subgrain rotation recrystallization (SGR) in quartz grains, also subgrain formation, deformation twins, flame-shaped prethities, and dynamic recrystallization (BLG) in feldspars, these indicated that the ductile deformation have occurred in 300-500 °C (upper green schist and lower amphibolites facies conditions). Age and cross cutting relations between various lithological units in the study area revealed that the ductile shear zones were formed during Cimmerian orogeny between Norian to Early Jurassic age.

Keywords: *ductile shear zone, Dehnow diorite, Mashhad*

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*Corresponding author, TeleFax: (0511) 8797275, E-mail: b-rahimi@ferdowsi.um.ac.ir