

## **The role of xenocrysts, enclaves and syn-plutonic dykes in the interpretation of magmatic evolution of the Alvand plutonic complex with emphasis on geological and mineralogical evidence for magma mingling**

**A. A. Sepahi**

*Department of Geology, Bu Ali Sina University, Hamedan  
E-mail: Sepahi@basu.ac.ir*

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**Abstract:** Despite that, in the Alvand complex, the mafic-intermediate rocks (gabbros, diorites and tonalites) are mostly older than felsic rocks (granodiorites and monzogranites), and mineralogical and geochemical discontinuity is seen between them, there are evidence that indicate they have sometimes been co-existed. With the studies on field relationship of rocks, xenocrysts assemblages, synplutonic dykes and their related enclaves I affirm synchroneous occurrence of mafic and felsic magmas, in some periods, and I present evidence of magma mingling/mixing between them. Gabbro-dioritic magmas of mantle origin from one side and crustal, anatectic magmas from another side were intruded the area repeatedly and sometimes synchronously, and produced a range of crustal (anatectic), mantle and hybrid rocks. Granitic rocks of crustal origin mostly contain restitic (surmicaceous) enclaves, sillimanite, andalusite, cordierite and garnet xenocrysts and their common mafic mineral is biotite (without any hornblende). Migmatitic rocks containing porphyroblast assemblages resemble the xenocryst minerals of granites occurring near to granites. Mantle type rocks (gabbro-diorite-tonalites) commonly have pyroxene and hornblende as common mafic minerals and surmicaceous enclaves and xenocrysts are not common in them. Hybrid rocks have a set of geological characteristics between crustal and mantle type rocks. Geochemical properties of mentioned rock types are seperatable from each other and confirm deductions outlined above.

**Keywords:** *mingling, Alvand, enclave, hybrid, magma, migmatite.*