



Geochemistry and petrogenesis of leucogranites in the Shahindezh Metamorphic Core (SMC), NW Iran

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Leucogranites emplaced along the shear zones or as dykes in the Shahindezh metamorphic core (SMC) HT/MP metapelites, a part of the Central Iran zone, during late Precambrian. A geochemical data set testifies peraluminous, medium to high potassic calc-alkaline magma differentiation producing a compositional range of granite and leucogranite. Petrographic and geochemistry studies suggest S-type character and syn-collision affinity for leucogranites. There are two distinct types of leucogranites at the area group 1 and 2, on the basis of chondrite-normalized REE patterns. The group 1 show fractionated REE pattern with negative anomaly of Eu, while the group 2 has flat REE pattern and positive Eu anomaly in some cases. Plagioclase rich residual of partial melting or weak plagioclase accumulation during magma generation was responsible of Eu depletion and enrichment in the group 1 and 2 rocks. The group 1 samples show flat mean crust-normalized REE pattern, displaying crustal material melting for magma source. While there is miscorrelation between group 2 and mean crust REE composition. Therefore crustal melting has not main contribution in the group 2 rocks magma generation. The primitive mantle-normalized patterns of leucogranites are marked by negative Nb, Ta, Ti and P anomalies indicating remaining of Ti-bearing phases in the residue. Trace element geochemistry indicates that the rocks were formed by muscovite breakdown melting reaction at relatively low temperatures (<750 °C).