

## **Geochemical and isotopic characterization of felsic magmatism from Central Indian Tectonic Zone (CITZ), central India: Implication of Nd model ages and crustal growth processes**

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In the northeastern part of the Central Indian Tectonic Zone (CITZ), felsic granulites are exposed along the NE-SW Central Indian Shear Zone (CISZ). Felsic granulites are the lower crustal felsic rocks typically characterised by garnet bearing and garnet free assemblages with minerals such as  $opx+cpx+plag+qtz\pm hbl\pm grt\pm bt\pm kfs$ . The igneous parentage is apparent from a combination of features including field relations, petrography and also distinct geochemical signatures. The geochemical data of felsic granulites rocks of supposed igneous origin always plot along the calc alkaline trend. The major oxides have negative variations with silica content and the trace-element contents and variation trends, such as increasing Rb, Ba and Eu, with increasing Yb and Sr, can be explained by partial melting and fractional crystallization of a granitic magma. A two-stage process is suggested for the formation of these felsic granulites. During the first stage there was a period of basalt underplating with the ponding of alkaline mafic magmas. Partial melting of this mafic lower crust formed the felsic magmas. The emplacement of basalt with low water content would prompt to dehydration melting of the lower crust, forming felsic granulites. Sm–Nd (whole rock) ages for the felsic granulites have two stages of  $T_{DM-Nd}$  (1.49-2.00 Ga) and (2.00-3.10 Ga) ages with negative values of  $\epsilon_{Nd}$  (-13.34 to -16.50) and (-16.60 to -36.00) respectively, indicating a Paleoproterozoic continental source for these rocks. These wide range values of negative  $\epsilon_{Nd}$  values indicate an enriched mantle source which might have experienced longer crustal residence time to evolve this significantly older sialic crust. Geochemical and Rb-Sr data for felsic granulites indicate that intracrustal differentiation and polyphase deformation were followed by granulite facies metamorphism. The granulite protoliths appear to have formed in a within plate granulite/rift environment.