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Neo-Proterozoic alkali mafic magmatism in Betul belt, Central Indian Tectonic Zone

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In this paper we are reporting Neo-Proterozoic alkali mafic magmatism from Betul belt in Central Indian Tectonic Zone (CITZ). Alkali gabbroic rocks are occurring as dykes and circular to subcircular bodies in the eastern part of the belt. They are least affected by deformation and metamorphism. Field evidence such as mixing, mingling with host granite suggest their emplacement in the veining stages of granite cooling. Petrographic studies indicate two distinct mineral assemblages. Aegirine augite, alkali amphiboles is present in one assemblage, whereas olivine, titan augite and enstatite are noticed in the



Figure.1. Photomicrograph of alkali gabbro showing intergrowth of phlogopite and aegirine augite

other with phlogopite, apatite, monazite, chevkinite, baddeleyite and huttonite as common minerals (Fig.1). Aegirine augite is poikilitically enclosed by biotite indicating alkali lineage. Intergranular and fretwork texture is noticed, where in biotite is developed in the intergranular spaces of plagioclase. Olivines are Fe rich having mg # varying from 32 to 61. Trace elements concentration is high i.e. high Zr (203 to 397 ppm), Rb (53 to 105 ppm), Sr (599 to 604 ppm) and Ba (951 to 1540 ppm).

Chondrite normalized REE pattern show moderate differentiation pattern with enriched LREE with no Eu anomaly and depleted to nearly flat HREE pattern. They are characterized by high Σ REE i.e. 280 to 492 ppm. Geochemically these rocks show distinct enrichment of LILE and HFSE characteristic of alkaline rocks formed from a metasomatized mantle source [1]. Monazite chime dating of alkali gabbros has yielded their emplacement around 912±39 Ma representing the last phase of the Grenvillian Orogeny in CITZ [2] emplaced in an intra-arc rift basin developed in a convergent setting.

References:

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