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Petrology and Geochemistry of Chintalapalle lamproite , Eastern Dharwar Craton, Southern India.

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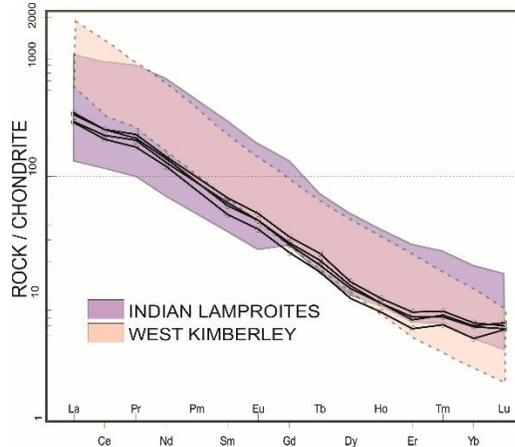
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A new lamproite has been reported in Eastern Dharwar Craton in Chintalapalle village, Mahbubnagar district, Telangana. Megascopically the lamproite is, fine-grained, highly altered, grey, hard and compact, carbonatised, containing rounded to elliptical pseudomorphs of microphenocrysts of feldspar and platy to fibrous potassic richterite in a groundmass of carbonate, chlorite, apatite and sphene.

It is ultrapotassic i.e., $K_2O/Na_2O > 3wt\%$ and peralkaline nature with $K_2O+Na_2O/Al_2O_3 > 0.7 wt\%$. The Chintalapalle lamproite together with those of Krishna, Vattikod, Ramadugu and Cuddapah Basin lamproites shows a large regional framework of mantle magmatism emplaced in and around the Cuddapah basin.

Petrographic studies reveal the presence of porphyritic texture comprising microphenocrysts of sanidine and richterite set in a groundmass rich in carbonate, and chlorite with rutile and titanite as accessory phases.



This Lamproite is characterized by low SiO_2 (43.48 – 44.96%), low Al_2O_3 (6.49-6.54%), Fe_2O_3 (9.82-10.07%), high MgO (11.53 –12.18%), high TiO_2 (3.44-3.48%), high K_2O (3.51-3.67%) with moderate content of Na_2O (1.09-1.12%). The lamproite shows elevated levels of Ba (395-494ppm), Ni (356-381ppm), Cr (329-350ppm) and Sc (15-1.9) ppm.

Figure 1: Spider plot (Nakamura 1974) of REE data of Chintalapalle lamproite compared with other Indian and West Kimberley Lamproites.

The LREE enrichment varies between 250-350 with respect of Chondrite (Nakamura, 1974) and the chondrite normalized REE plot indicates that this lamproite compares well with other Indian and West Kimberley lamproites (Figure-1). Geochemical characteristics such as high $Mg\#$ (56.40-57.87), abundance of compatible elements (Ni, Cr and Co), and low HREE contents imply a refractory mantle source that had experienced previous melt extraction (e.g. Mitchell and Bergman 1991). High $(La/Yb)_n$ varying between 49.68-55.17 and low HREE contents also imply generation of the lamproite magma by small degrees of partial melting from an enriched (metasomatised) mantle source within the garnet stability field.

References:

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