# Identifying the source characteristics of intraplate alkali basalts, hosting the lithopsheric mantle xenolith from Kutch area, western India

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The early magmatism related to Deccan volcanic eruptions during late Cretaceous in relation to the passage of the northerly drifting Indian plate over the Réunion plume resulted alkali-basalt magma, compositionally ranging from nephelinite to basanite and contains fragments of lithospheric mantle as xenoliths. Compositionally, xenoliths are spinel peridotites belonging to Type-I group: Cr-diopside lherzolite [1] representing the continental lithospheric mantle beneath Kutch area. Geochemically, they are off-cratonic peridotite undergone lower degree of melt extractions i.e. upto 15 wt%. Host lavas exhibits less fractionated nature, retain their primitive character during ascent to the surface. They have high Mg# (>60), high $TiO_2$ comparable with global OIB and depletd in $Al_2O_3$ suggesting garnet being the residual phase for their source magma. Trace element systematics indicate towards OIB type deep melting source for the generation of these basalts. Using PRIMACALC2 [2], estimated partial melting of mantle peridotite to generate these basalts is ranges from 0.4 to 4 wt% at 2.41 to 2.8 Gpa which requires mantle potential temparature of ~1467 ºC. This high Tp may be associated with deep thermal upwelling (PLUME). These basalts also possess geochemical signatutre similar to those of carbonatite, including high Ca/Al and Zr/Hf ratios negative K, Zr, Hf and Ti anomalies. We suggest, carbonatitic fingerprints of these rocks inherited from the asthenospheric source that is low carbonated peridotite. Also the strongly alkaline nephelinite represent lower degrees of melting at their source compared to the weakly alkaline basanite, as estimated from their La/Yb and Sm/Yb ratios. These undersaturated magma also metasomatised the lithosphere by host melt-peridotite interactions [3].

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