



Geochemistry and petrogenesis of lamproites from Telangana State, India

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Lamproites belong to an extremely rare group of rocks which are known for their unique texture and exotic mineralogy. In common with other equally rare intrusive rocks like kimberlites, lamprophyres and carbonatites. Lamproites also belong to such a group which is known for their exotic mineralogy and unique geochemical characteristics. As in other parts of the world, lamproites are more uncommon even in India, where these rocks are reported from a Bastar province and in the recently recognized Cuddapah Intrusive Province in Peninsular India. Ever since the 'lamprophyres' of Chelima were recognized as lamproites, reports started appearing to declare the occurrence of lamproites from many parts in the Eastern Dharwar Craton in general and in the Cuddapah Intrusive Province in particular. One such occurrence is the lamproites from newly formed state of Telangana in the Southern Peninsular India, which are found at Ramadugu followed by Somavarigudem, Yacharam, Vattikod, Gundrapalle and Marepalle.

The Lamproites of Telangana exhibit a wide range in their mineralogy with varieties that include the combination of diopside-leucite; phlogopite-leucite; olivine and ritcheite-phlogopite. These medium to fine-grained lamproites typically exhibit a porphyritic texture with carbonated and serpentinized olivine along with diopside, fluorine rich phlogopite, sanidine, ritcheite, apatite, chromite, allanite and calcite. Higher fluorine content of the hydrous phase coupled with higher whole rock K_2O highlights the role of metasomatic phlogopite and apatite in the mantle source regions. Trace element ratios such as Zr/Hf and Ti/Eu reveal carbonate metasomatism of mantle previously enriched by ancient subduction processes.

As mentioned already these lamproites display a wide range in their major, trace and REE geochemistry. The occurrence of large number of lamproites in close spatial and temporal association with kimberlites in the Cuddapah Intrusive Province indicates an extensive mantle metasomatism or enrichment that preceded the generation of the kimberlite and lamproite magmas in the province during the Mesoproterozoic time. All the available evidences point to a mantle which underwent extensive melting to form harzburgite prior to the generation of kimberlite and lamproite magmas.