

Paper Number: 3482

Typomorphic mineralogy of the Vattikod lamproites from Mesoproterozoic Ramadugu Lamproite Field, Nalgonda District, Telangana, India: A plausible manifestation of subduction-related alkaline magmatism in the Eastern Ghats Mobile Belt?

Gurmeet Kaur¹, Mitchell, R. H.² and Ahmed, S.³

¹ Department of Geology, Panjab University, Chandigarh UT-160014, India; Email: gurmeet28374@yahoo.co.in

² Department of Geology, Lakehead University, Thunder Bay Ontario, Canada P7B 5E1

³ Geological Survey of India, Southern Region, Hyderabad - 500 068, Andhra Pradesh, India

Lamproites are mineralogically complex rocks and their bulk rock geochemistry is not for characterization of their parental magmas (Mitchell and Bergman, [1]). Characterization is best accomplished by consideration of their typomorphic mineralogy. We have investigated nine dykes from Vattikod (VL1:VL8 and VL10). The mineral assemblage and their compositions are comparable to those of lamproites in terms of the presence of phlogopite (Ti-rich, Al-poor phlogopite and tetraferriphlogopite); amphiboles (potassic-arfvedsonite, potassic-richterite, potassic-ferro-richterite, potassic-katophorite, Ti-rich potassic-katophorite, Ti-rich potassic-magnesio-katophorite); Al-poor pyroxene; feldspars (K-feldspar, Ba-K-feldspar and Na-feldspar), spinels (chromite-magnetite and qandilite-ulvöspinel-ZnFe₂O₄). These dykes have also undergone varied degrees of deuteric alteration as shown by the development of secondary phases such as titanite, allanite, hydro-zircon, calcite, chlorite, quartz and cryptocrystalline SiO₂.

We have classified the Vattikod dyke on the basis of their typomorphic major mineralogy in conjunction with alteration affects as: Group 1 (VL1); Group 2 (VL2 and VL3); Group 3 (VL4 and VL5); Group 4 (VL6, VL7 and VL8); and Group 5 (VL10). Group 2 dykes are **pseudoleucite-amphibole-lamproite**; Group 3 dykes are **pseudoleucite-phlogopite-lamproite**; Group 4 dykes are **pseudoleucite-phlogopite-amphibole-lamproite**. The Group 1 dyke is completely altered and the precursor mineralogy cannot be identified. Group 5 dyke is also extensively altered but contains fresh euhedral apatite microphenocrysts together with pseudomorphs after leucite and is classified as a **pseudoleucite-apatite-(phlogopite?) lamproite**.

It is suggested that the Vattikod lamproites represent a spectrum of modal variants of lamproite produced by the differentiation and crystallization of a common parental peralkaline potassic magma. The near-linear disposition of Deformed Alkaline Rocks and Carbonatites commonly known as DARC's (Burke and Khan, [2]) and lamproites in eastern India implies a relationship with subduction-related processes (Das Sharma & Ramesh, [3]; Gurmeet Kaur & Mitchell, [4]). We propose that the Vattikod and other lamproites in eastern India emplaced at 1100-1450 Ma are possible manifestations of subduction-related alkaline magmatism along the Eastern Ghats Mobile Belt, in contrast to extension-related anorogenic lamproite magmatism related to supercontinent(s) break-up as has been suggested for Ramadugu and other Dharwar Craton lamproites.

References:

[1] Mitchell R H and Bergman S C (1991) Petrology of Lamproites: 447pp

[2] Burke K and Khan S (2006) Geosphere 2: 53-60

[3] Das Sharma S and Ramesh D S (2013) Lithosphere 5: 331-342

[4] Gurmeet Kaur and Mitchell RH (2015) Mineralogy and Petrology. Published online 8th August, 2015. DOI 10.1007/s00710-015-0402-6

