

Vogesite and Shonkinite from the carbonatite complex of Tirupattur, Tamil Nadu, India

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The carbonatite complex of Tirupattur, containing rare alkaline rocks, was emplaced in the two adjacent structural Sevvattur and Jogipatti basins. Amidst this complex, in proximity to carbonatitic outcrops of Sevvattur, a melanocratic dyke of vogesite with an arcuate exposure (70 m X 10m) occurs within granite gneiss. Shonkinite is emplaced at the contact of ultramafic rocks and granite gneiss on the outer periphery of the Jogipatti basin. Vogesite is porphyritic to almost panidiomorphic in texture and contains abundant phenocrysts of mafic minerals which are set in the groundmass comprising both felsic and mafic constituents. Shonkinite, on the other hand, is essentially composed of equal proportion of anorthoclase and augite with accessory olivine, amphibole, biotite, magnetite and apatite.

Vogesite has high K/Rb ratio and high Rb (165ppm) which suggests high fractionation by differentiation. High Ba and Sr (10,000 ppm) values with enrichment of Nb (50 ppm), La (60ppm), Yb (30 ppm) and Y (100 ppm) point to its affinity to the associated carbonatites. The chemical composition of shonkinite is intermediate between the alkali-syenites of the Sevvattur basin and the vogesite, of the Jogipatti basin.

The vogesite was formed as a product of differentiation of a CO₂-rich monzonitic magma under wet conditions (Ramasamy, 1984). However, new major and trace element data on the Tirupattur complex have indicated that all the alkaline rocks (vogesite, shonkinite and alkali-syenites) and associated carbonatites were evolved at depth in a closed magmatic chamber from a carbonated shonkinitic parent magma.