

PETROGRAPHIC AND GEOCHEMICAL CHARACTERISTICS OF CHARNOCKITE FROM ASIND, DISTRICT - BHILWARA, RAJASTHAN : IMPLICATIONS FOR ITS ORIGIN

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Abstract

The charnockite rocks around Asind are intrusive into the rocks of Banded Gneissic Complex (BGC). Petrographic characteristics suggest that the orthopyroxene in charnockite was derived from the dehydration of in-situ biotite. The presence of biotite + garnet rich aluminous enclaves within charnockite indicates assimilation of charnockitic magma through partial melting of pre-existing crustal segments prior to their re-crystallization. As per geochemical signature charnockite of Asind are metaluminous, ferroan and calc-alkalic to calcic nature. The SiO₂ and normative hypersthene content varies from 62.17-69.15% and 4.94-16.8 respectively. The rock shows normal magmatic differentiation trend of calc-alkaline magma with FeO/MgO ratio of 4.62-5.84. The higher LREE/HREE ratio (70.11-679.65) and (La/Yb)_N (4.27-12.13) ratio along with prominent negative Eu anomaly indicate highly evolved nature of magma with its origin from asthenospheric mantle source. Development of garnet-clinopyroxene-quartz rim around hypersthene against its contact with plagioclase marks the boundary between intermediate to high pressure granulite. The Y-Nb-3Ga ternary discrimination plot and Sc/Nb vs. Y/Nb binary discrimination plot suggest the affinity of Asind charnockite with A-2 subgroup. These charnockite were emplaced into the rocks of BGC under anorogenic tectonic setting.

Keywords: Charnockite, dehydration, magmatic differentiation, partial melting, Asind, Rajasthan.