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ELECTRON MICRO-PROBE MINERAL CHEMISTRY AND DATING OF MONAZITE FROM THE CORDIERITE-GNEISSES NEAR VIZIANAGARAM IN THE EASTERN GHAT GRANULITE BELT, INDIA

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Abstract

Electron Micro-Probe (EMP) analysis of accessory monazites in the cordierite-gneisses near Vizianagaram, Andhra Pradesh (AP) in the Eastern Ghats Granulite Belt shows 0.5-0.6% CaO, 28% P_2O_5, 13.0-13.8% La_2O_3, 25-26% Ce_2O_3, 2.8% Pr_2O_3, 10.2-10.4% Nd_2O_3, 3.3-4.5% Sm_2O_3, 3.8-4.5% Y_2O_3, 8.2-9.1% ThO_2 and 0.1-0.2% UO_2. Data show the inverse relationship of Th and Ca with both light and heavy REE. This chemical data of monazite present in the rock, when compared with that of detrital monazite occuring in placer mineral sands of the nearby Kalingapatnam coast shows that the content of La, Ce, Pr, Nd, Th and U in both are comparable, whereas the content of Sm and Y in the former are much more than that of the latter, while Ca content in the former is less than that of the latter. Using the EMP-based chemical data on Th and Pb content in monazites under study, their dating reveal two age groups, one at 932 + 38 Ma, which corresponds to the ~ 1000 Ma granulite metamorphism in Visakhapatnam and Anakapalle regions of AP, and the second at 836 + 36 Ma, which corresponds to ~ 850 Ma age, reported for the intrusive granites and pegmatites occurring in Eastern Ghats Granulite Belt.

Keywords: Monazite, EMP-based mineral chemistry, Th-Pb dating, cordierite gneiss, Eastern Ghats Granulite Belt (EGGB), Andhra Pradesh