COMPOSITIONAL VARIATION IN GARNETS FROM DIFFERENT ROCKS
OF EASTERN GHAT MOBILE BELT AROUND DIGAPAHANDI
AREA, GANJAM DISTRICT, ODISHA

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Abstract

As the relation between garnet chemistry and metamorphic condition is traditional, the importance of garnet in metamorphic petrology needs to be better understood. Garnet group of minerals provide information in terms of chemical composition, by utilizing which one can estimate the metamorphic P-T conditions, under which a rock has been formed. Khondalites, leptynites, charnockites and patchy charnockites are the important rocks exposed around Digapahandi area of Eastern Ghat Mobile Belt (EGMB) and garnet is a common mineral phase present in all these rock type. Hence garnets from each rock type were selected (total 39 points) for electron probe micro analysis (EPMA). A distinct compositional variation exists amongst garnets from different rocks, with abundant almandine content (67.845 – 88.028) and subordinate amount of pyrope, spessartine and grossular. These compositional variations in garnets from the different rocks of EGMB are not only due to variation in bulk rock composition but also due to distinct temperature and pressure conditions of metamorphism of these rocks. There is also a discrete variation in garnet composition from core to rim in each rock type. Growth zoning have developed in garnets from charnockites and khondalites while diffusion zoning is observed in the garnets from leptynites and patchy charnockites. Garnets in charnockites and khondalites are believed to have formed by prograde metamorphism during peak metamorphism. However garnets in leptynites and patchy charnockites are opined to have originated by retrograde metamorphism during exhumation following peak metamorphism.

Keywords: Garnet chemistry; zoning; khondalites; leptynites; charnockites; patchy charnockites; Eastern Ghat Mobile Belt.