

スリランカの arrested チャーノックタイトの形成：全岩化学組成と物質移動 Metamorphic formation of arrested charnockite in Sri Lanka: significance of bulk composition and mass transformation

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Arrested charnockite, that represents granulite facies mineral assemblage, occurs in several decimeters scale within amphibolite facies gneisses. The gneissosity in the gneiss becomes, in general, obscure toward center of charnockite. This suggests that the gneiss was metamorphosed into charnockite in local scale. The local charnockitization may be caused by fluid influx and/or partial melting or difference of local bulk composition (e.g. Newton et al., 1980; Hiroi et al., 1990; Burton and O'Nions, 1990; Ravindra Kumar, 2004; Endo et al., 2012, 2013). This study described mode of occurrence of arrested charnockite in Sri Lanka, and reveals cause of metamorphic formation of arrested charnockite. Mass transformation during charnockitization was also discussed.

Arrested charnockite in Sri Lanka occurs as a number of patches in Hbl-Bt gneiss. The modal abundance of minerals in both rocks indicates that the elements transformed between melanocratic and leucocratic parts. The elements constituent of Bt in leucocratic part moves to melanocratic part, and those of Pl, Ksp and Qtz of melanocratic part, instead, move to leucocratic part. The modal abundance of Bt of leucocratic part in Hbl-Bt gneiss decreases into the charnockite near the boundary. This suggests that mass transformation also be caused across the boundary.

The formation of Opx can be described by the following two reactions,

Ti-rich Bt + Qtz = Ti-poor Bt + opx + Ilm + Ksp + H₂O and

Ti-rich Hbl + Qtz = Ti-poor Hbl + Opx + Ilm + An + Ab + Ksp + H₂O.

These reactions suggest the possibility that the fluid influx and/or the partial melting produced arrested charnockite. However, similar chemical composition of apatite in both rocks implies that there is no positive evidence to support the above possibility. The pseudosection modeling of mineral assemblage in NCKFMASH system shows that the local difference of bulk composition is responsible for the local charnockitization.

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