[JJ] Evening Poster | S (Solid Earth Sciences) | S-CG Complex & General

[S-CG60]Petrology, Mineralogy and Resource Geology

convener:Koichi Momma(National Museum of Nature and Science), Tatsuo Nozaki(Research and Development Center for Submarine Resources, Japan Agency for Marine-Earth Science and Technology), Satoshi SAITO(愛媛大学大学院理工学研究科, 共同), Nobutaka Tsuchiya(Department of Geology, Faculty of Education, Iwate University)

Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

We widely invite presentations in the fields of petrology, mineralogy and resource geology. Especially description of minerals and rocks, investigation of their origin and evolution by field investigation and/or laboratory experiments, and development of new methods are accepted.

[SCG60-P06]Clockwise pressure-temperature-time evolution of ultrahigh-temperature pelitic granulites from the Trivandrum Block, southern India: New insights from zircon U–Pb and REE analyses

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The Southern Granulite Terrane in India is composed of various Archean to Neoproterozoic continental, magmatic arc, and supracrustal units amalgamated through complex subduction–accretion–collision processes during the Latest Neoproterozoic to Cambrian Gondwana amalgamation. The Trivandrum Block located in the southern margin of the terrane is composed dominantly of granulite-faces metasediments (khondalite and leptynite) and orthogneisses (charnockite, biotite gneiss, and mafic granulite). Numerous previous studies on granulites from this area argued various peak *P–T* conditions obtained from this block. In this study, we present new petrological, geothermobarometric, and zircon U*–*Pb and REE data of khondalites from Elavinmoodu quarry located in the western part of the Trivandrum Block, evaluate the timing and *P–T* conditions of high-grade metamorphism, and discuss *P–T–t* evolution of this region for unraveling the tectonic evolution of this block.

The dominant lithologies of this quarry are leptynite (plagioclase + K-feldspar + quartz + garnet + biotite + ilmenite + magnetite) and khondalite. Peak, prograde, and retrograde mineral assemblages of the khondalite are quartz + garnet + plagioclase + K-feldspar + ilmenite + sillimanite + spinel, biotite + quartz + garnet + plagioclase + K-feldspar + ilmenite + sillimanite, and quartz + garnet + plagioclase + K-feldspar + ilmenite + magnetite + cordierite, respectively. Application of ternary feldspar geothermometry on mesoperthites in khondalites yielded peak temperatures of 1000–1100 °C at 8 kbar, suggesting UHT metamorphism recorded in the rocks. Application of mineral equilibria modeling in the system NCKFMASHTO indicates peak *P–T* condition of 920–1020 °C and 6.9–7.5 kbar, which further confirms UHT metamorphism of this region. Prograde and retrograde *P–T* conditions of 750 °C/7 kbar and 800 °C/4 kbar, respectively, were also obtained, suggesting a clockwise *P–T* evolution.

U–Pb and REE analyses of zircons suggest that low-HREE zircons grew together with garnet

possibly during partial melting and melt crystallization stage in the rock at ca. 580 Ma at temperature conditions of >810 °C during prograde metamorphism. Relatively HREE-enriched zircons grew at ca. 530 Ma possibly by garnet decomposition related to partial melting of the rock during retrograde metamorphism. Growth of REE-enriched zircons at ca. 490 Ma might be related to fluid infiltration and hydration of garnet. These results suggest clockwise *P–T* evolution, and the high-grade metamorphism continued at least 55 Myr.