

Earth and Planetary Materials Science Seminar (No.1835)

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Date & Time : May 8th 2014 13:10~15:30

場所：地学生物共通講義室

Room : Earth Science & Biology Lecture Room

-----ABSTRACT-----

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Title: Petrology of Pan-African ophiolite rocks in the Tulu Dimtu area, Western Ethiopia

(A) Research background (Previous studies)

The Tulu Dimtu Belt is a NNE-SSW trending litho-tectonic unit, which forms the volcano-sedimentary terrain of the Pan African Arabian-Nubian shield of East African Orogen. It is characterized by a variety of lithological units, including Serpentinized dunite, serpentine schist, talc serpentine, carbonated serpentine, metapelite, quartzite and metadiorite rocks of ophiolitic origin.

(B) Method

Geological mapping and sampling, 31 thin sections have been prepared and mineral chemistry of the constituent crystals i.e. olivine and spinel were examined using EPMA JEOL JSM 5410 at the Earth Science department laboratory of Tohoku University, Japan.

(C) Results and Discussions

Chrome spinels in studied samples occur as disseminated grains. Most disseminated grains of spinels show euhedral to subhedral shape. There is no compositional variation between spinels in serpentinized dunite and serpentine schist but, those from carbonated serpentine exhibit a wide range of composition. The Cr# of chrome spinel in serpentinized dunite and serpentine schist ranges from 0.84 to 0.89 in core and 0.82 to 1 in rim, Fe³⁺# (0.014-0.024) in core and (0.274-0.978) in rim, TiO₂ contents are low (0-0.11 wt %), whereas spinels from carbonated serpentine Cr# (0.576-0.88) in core and (0.86-1) in rim, Fe³⁺# (0.001-0.027) in core and (0.039-0.98) in rim, TiO₂ contents are high (0.13-0.23 wt%). Olivines in serpentinized dunite are highly forsteritic with slightly low variation (Fo_{90.3-96.1}).

(D) Conclusions

The chrome spinel in serpentinized dunite, serpentine schist and carbonated serpentine from Pan African ophiolites of Tulu Dimtu, Western Ethiopia shows compositional variation of Fe³⁺# and Cr# from core to rim, reflects alteration at various extent. The high-Cr# (0.58-0.89), low-TiO₂ (0-0.11 wt %) content of Tulu Dimtu chrome spinel in serpentinized dunite and serpentine schist suggests that they are boninite type harzburgites, however one of the studied samples show MORB type (TiO₂, 0.13-0.23). The high forsteritic (Fo_{90.3-96.1}), character of olivine in serpentinized dunite from Tulu Dimtu area shows residual after extensive melting.

Keywords: Pan African; Arabian-Nubian shield; East African Orogen; boninite; Tulu Dimtu Belt, Western Ethiopia