

Rutile included in the podiform chromitite from ocean floor at MAR 15°20'N FZ, Site 1271, ODP Leg 209

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Several podiform chromitites includes rutile grains in abyssal peridotite are recovered from Site 1271 at Mid-Atlantic Ridge (MAR) 15°20' N fracture zone (FZ) during an ocean drilling cruise, ODP Leg 209 [1]. Only chromian spinel is preserved as the primary mantle mineral and all other primary minerals in the chromitite samples are completely altered. The primary chromian spinel has comparable Cr# (0.5) with it in the chromitite "minipod" sampled from Hess Deep [2]. The samples associated with chromitites from the drilling site consist of mainly dunite, some amphibole-bearing gabbros and troctolite, and rare in harzburgite. Therefore, the chromitites from this site are included in the rock series that composes the Moho transition zone as same in the ophiolites. It implies that a mass of melt existed, but was consumed in the uppermost mantle beneath the area. This means that the area is not magma-starved, although it is unclear when and where did interaction occurred. Some grains of the chromian spinel in the samples have thick rims of Cr-magnetite or completely replaced by magnetites. Cr content increases in the Cr-magnetite rim accompanied with Fe-enrichment. The chemical modification of the chromian spinel suggests that the chromitite from Site 1271 were metamorphosed at high temperature condition up to the upper greenschist facies because significant Al-missing from spinel cores is taken place at high temperature as a result equilibration with fluids in equilibrium with chlorite.

[1] Abe, N. (2011) Petrology of the podiform chromitite from ocean floor at MAR 15°20'N FZ, Site 1271, ODP Leg 209. *Jour. Mineral. Petrol. Sci. In Press.* [2] Arai, S. and Matsukage, K. (1996) Petrology of the gabbro-troctolite-peridotite complex from Hess Deep, equatorial Pacific. In *Proc. ODP, Sci. Results*, **147**, 135-155.

Geological, mineralogical and geochemical characteristics of Saheb Skarn (west of Iran)

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Saheb Iron Deposit is located in the northeast of Saghez in Sanandaj-Sirjan geotectonic zone, NW of Iran. Saheb Fe-skarn was developed along the contact of Saheb intrusive body with carbonatic rocks. Both endoskarn and exoskarn zone have been formed along the contact. Endoskarn is narrow while exoskarn is relatively wide and includes calc-silicates, silicates, sulphide, oxides, and carbonates minerals. Skarnification processes occurred in two separate stages (1) prograde (2) retrograde.

According to field and lab studies on Saheb intrusive body is granite to granodiorit I-type, metaluminous and calc-alkalin. Calcareous host rocks have been recrystallized by this intrusive body. Also several forms of fine-grained garnet and amphibole have been formed close to skarn contact while fine-grained epidote formed relatively farther from the contact. Anhydrous calc-silicates has been formed during early prograde stages at temperature range of 420-550°C. The retrograde stage began as the temperature of hydrothermal fluids decreased up to 400-420°C. During this stage, the anhydrous calc-silicate minerals were changed to a series of relatively low-temperature minerals.

Geochemical trend of major, minor and rare earth elements shows that considerable amounts of elements such as Fe, Si, Cu, K, Th, and Nb were added to the skarn system by the hydrothermal fluids derived from the pluton. In contrast, notable quantities of Ca and Mg were leached from the skarn system. It seems that garnets are the most principal host minerals for REEs, U, Y, and Th in this skarn. The main ore mineral are magnetite and hematite with up to 10 thick with Fe: 51.72%, Cu: 0.35%, Au: 0.038ppm.