Geophysical Research Abstracts
Vol. 13, EGU2011-5396, 2011
EGU General Assembly 2011

Origins of ophiolitic chromitites: magmatic accumulat and deep recycling

Shoji Arai (1,2) and Ahmed H. Ahmed (3)

(1) Kanazawa University, Department of Earth Sciences, Kanazawa, Japan (ultrasa@kenroku.kanazawa-u.ac.jp), (2) IFREE, JAMSTEC, 2-15 Natsushima-cho, Yokosuka, Japan, (3) King Abdulaziz University, Jeddah, Saudi Arabia

We should re-examine the genesis of ophiolitic podiform chromitites; some of them have properties indicative of magmatic cumulate at shallow mantle levels but diamond and other ultra-high pressure (UHP) minerals have been found in others, especially in Luobusa chromitites, Tibet (e.g., Robinson et al., 2004). Many features, such as enveloping by dunite replacive of harzburgite, of podiform chromitites can be explained by harzburgite/melt interaction and subsequent melt mixing at the shallowest upper mantle (e.g., Arai and Yurimoto, 1994). The Luobusa chromitites, although sharing many features with some ordinary podiform chromitites (e.g., Nicolas, 1989), are of UHP origin because of exsolution of UHP minerals (e.g., coesite) from chromian spinel: Arai (2010) interpreted them as deep recycled materials originated from shallow mantle cumulates.
We revisit the topic of two types of podiform chromitites (concordant and discordant) from the deep mantle section of Wadi Hilti, northern Oman ophiolite (Ahmed and Arai, 2002). As mentioned by Ahmed and Arai (2002), the concordant and discordant chromitites differ from each other in many points, i.e. texture, mineral chemistry, PGE content and PGM species. In addition, needle-like silicates (pyroxenes) in chromian spinel have been observed only in the concordant chromitite from Wadi Hilt. They are very similar in appearance to silicate exsolutions in spinel from the UHP chromitites from Tibet (Yamamoto et al., 2009). This indicates the Hilti concordant chromitite has experienced possibly high-T and hih-P conditions like the Tibetan UHP chromitites. We consider a possibility of UHP origin for the concordant chromitite from the Oman ophiolite. Deep recycling may be the best way for UHP genesis for chromitites.