

# Petrological insights of the first recovered podiform chromitites from Site 1271, ODP Leg 209, MAR 15N

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ODP Leg 209 recovered several podiform chromitites at Site 1271, Mid-Atlantic Ridge close to the 15 20N fracture zone. These chromitites are the first sampled from the Mid-Atlantic Ridge. Furthermore, Site 1271 is only the second chromitite locality that has been found along any Mid-Ocean Ridges. The first chromitite found, which from near the East Pacific Rise at Hess Deep at ODP Site 895 (Arai and Matsukage, 1996), is a single, elongate, discontinuous train of chromite grains less than 1 cm wide. In contrast, the Site 1271 chromitites are rounded rather than elongate, have sharp contacts with surrounding peridotite, and are clearly massive. It has been proposed that the formation of chromitite occurs during subduction-related arc magmatism only, because the formation requires hydrous magmas (Matveev and Ballhause, 2002). Therefore high Cr# have been cited as evidence that most ophiolites with high Cr# in mantle spinels do not form at normal Mid-Ocean ridges .

Based on our results, confirming the Hess Deep observation, it is clear that chromitites are not restricted to arc magmatism. However, there is abundant high-temperature amphibole in core from Site 1271, some of which could be igneous. Based on the of unusually high-Cr# (higher than 0.6) in spinels from harzburgite and dunite dredged from the Mid-Atlantic Ridge in the 14 to 16 N region (Bonatti et al., 1992; Dick and Kelemen, 1992; Sobolev et al., 1992; Casy, 1997) and the general observation that spinels in chromitites have higher Cr# than spinels in residual mantle peridotites (e.g., Dick and Bullen, 1984), we anticipate that the Cr#s Site 1271 chromitites are the highest yet found in spinel from Mid-Ocean ridge setting. High Cr#s can provide insight into the processes of chromitite formation and may give rise to new interpretation of ophiolite provenance.

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