

Chromite-hosted sulfide inclusions in the Southwest Indian Ridge (SWIR) podiform chromitites

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Small pods of chromitites occur within dunites in Dredge 62 of the Knorr Cruise 162 Leg 9 from the Southwest Indian Ridge. The size of the pods varies from a few mm to 2 cm in width. Dunites hosting the chromitite pods are chromite-poor and dominantly composed of olivine which had been severely serpentized. Small relics of olivine are very rare within dunites. These olivines are forsteritic (Fo content=90-91) with NiO wt%=0.31-0.35. The chromitite pods are composed solely of large chromite grains usually rimmed by chlorite. Chromites have very low Cr# (=0.22-0.23) and TiO₂ content is 0.13-0.17 wt%. Except for a few sulfide inclusions, the chromites are totally free of hydrous and silicate inclusions which are reportedly common in podiform chromitites. The euhedral sulfide inclusions (<10 μm in size) occur away from cracks or lamella within the chromites and are believed to be primary in occurrence. Hydrous and silicate phases and rutile have been noted as mineral inclusions within the chromites in the East Pacific Rise and Mid-Atlantic Ridge podiform chromitites (Arai and Matsukage, 1998; Abe, 2011). This work reports for the first time the occurrence of sulfide inclusions within chromites in podiform chromitites in the abyssal setting. These sulfide inclusions possibly represent the melt responsible for chromite crystallization and may provide important information on the mechanisms for the formation of podiform chromitites in the current oceanic floor.

Keywords: sulfide, inclusion, chromite, podiform chromitites, abyssal