

PGE remobilisation during metamorphism of chromitites in Central Chile

*J. M. GONZÁLEZ-JIMÉNEZ^{1,3}, F. BARRA¹, M. REICH¹,
E. HERNÁNDEZ¹, F. GERVILLA², W.L. GRIFFIN³,
SUZANNE Y. O'REILLY³ AND N. J. PEARSON³

¹Dpt. Geología and Andean Geothermal Center of Excellence (CEGA), Universidad de Chile, Santiago, Chile
(*Correspondence: jmgonzj@ing.uchile.cl)

²Dpt. Mineralogía y Petrología (UGR) and Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR), Granada, Spain

³CCFS Centre of Excellence and GEMOC, Macquarie University, Sydney, Australia

The La Cabaña meta-peridotite massif is the the largest exposure of upper mantle rocks in the metamorphic basement of the Coastal Cordillera of Central Chile. The massif consists of meta-dunitites hosting a few chromitite bodies. Greenschist-amphibolite facies metamorphism at ca. 250 Ma ago has produced strong changes in the structure and chemistry of the original chromite. In particular, chromite grains forming chromitite bodies show cores surrounded by Fe²⁺-rich porous chromite, which sometimes may be enveloped by Fe³⁺-rich chromite (or ferrian chromite). This alteration of chromite is associated to the chemistry of the fluids (reducing or oxidizing), the chromite/silicate (olivine, serpentine) ratio, and the water/rock ratio.

The chromitites show total whole-rock PGE contents varying from 108 to 1321 ppb, with the typical the typical predominance of IPGE (Os, Ru, Ir= 106-1198 ppb) over PPGE (Pt, Pd, Rh= 2-36) reported for Type-I ophiolitic chromitites [1]. The abundances of IPGE have their mineralogical expresion as abundant inclusions of Os-Ir-Ru alloys, laurite (RuS₂)-erlichmanite (OsS₂), irarsite (IrAsS), and minor omeiite (OsAs₂), and Ru-Ni alloys. The PPGE-rich assemblage mainly includes Rh-rich minerals such as hollingworthite (RhAsS) and an unidentified antimonide (Rh-Cu-Sb). Laurite-erlichmanite is comonly replaced by Os-Ir-Ru alloys in pores of Fe²⁺-rich chromite, suggesting desulfurisation under reducing conditions. This process could be also responsible for the formation of Ru-Ni alloys after breakdown of Ru-bearing Ni-rich sulfides. In contrast irarsite, omeiite and the unknown Rh-Cu antimonide are most likely associated with oxidising fluids supplying As and Sb to the system causing “within-system” redistribution of the PGE.

[1] González-Jiménez et al (2014). *Lithos* **189**, 140-158.