MINERALOGY AND ORIGIN OF DIAMOND-BEARING CHROMITITES IN THE LUOBUSA OPHIOLITE, TIBET

[1]ROBINSON, P. T., [1]HU, X.-F., [2]BAI, W.-J. and [3]ZHOU, M.-F.
[1]Dalhousie University, Halifax, Canada; [2]Academy of Geological Sciences, Beijing, China; [3]University of Hong Kong, Hong Kong

Podiform chromitites of the Luobusa ophiolite contain an unusual mineral assemblage, consisting of ultra-high pressure phases such as diamond and SiC, native elements including Fe, Ni, Cr, Si and graphite, PGE, base-metal and other alloys, numerous silicate minerals, sulphides, sulphates and carbonates. We recognize four paragenetic groups: high-temperature magmatic phases (chromite+olivine+pyroxene), moderate-temperature magmatic phases (mostly silicates), alteration phases (sulphides, sulphates, carbonates, some alloys and low-temperature silicates) and UHP phases (diamond, SiC, Si-Fe(?)). Cr#s in the chromites range from 77 to 84 and Mg#s from 62 to 78, suggesting crystallisation from a boninitic melt.

The diamonds are mostly colourless octahedra, 0.2-0.5 mm across. One broken fragment (up to 1.0 mm across) contains silicate inclusions. SiC forms euhedral or broken crystals, 0.1 to 1.1 mm across, which range from colourless to deep bluish-green. Many are colour-zoned and some have calc-silicate inclusions.

The chromites and host peridotites have not been subjected to ultra-high pressure metamorphism, thus we suggest that the diamonds, SiC and some alloys are xenocrysts from deep mantle sources. Alternatively, the diamonds and SiC could possibly have formed outside their stability fields by hydrothermal processes.