# Diamonds in ophiolitic chromitites are not in all cases formed at UHP conditions

J. FARRÉ-DE-PABLO[1]*, J.A. PROENZA[1], J.M. GONZÁLEZ-JIMÉNEZ[2], A. GARCIA-CASCO[2,3], V. COLÁS[4], J. ROQUÉ-ROSELL[1], A. CAMPRUBÍ[4], A. SÁNCHEZ-NAVAS[2]

[1]Department of Mineralogy, Petrology and Applied Geology, University of Barcelona, 08028, Barcelona, Spain (*correspondence: jfarredepablo@gmail.com)

[2]Departmento of Mineralogy and Petrology, University of Granada, 18002, Granada, Spain

[3]Andalusian Earth Science Institute (IACT), Spanish Research Council (CSIC)–University of Granada, 18100 Armilla, Granada, Spain

[4]Institute of Geology, National Autonomous University of Mexico, 04510, Ciudad de México, Mexico

In the recent years, the occurrence of diamond in ophiolitic chromitites and associated rocks has been confirmed by a series of findings in ophiolites worldwide. Diamonds are being found in mineral concentrates from chromitites and, only very rarely, in situ. Several models have been proposed in order to reconcile these discoveries with abundant evidences of chromitite formation at shallow upper mantle depths. These models involve the recycling or formation of the chromitites near the Mantle Transition Zone, where the chromitites would incorporate the diamonds formed at UHP conditions.

We have found microdiamonds (from 1 to 8 µm in diameter) included along sealed fractures in chromite forming chromitites from Tehuitzingo serpentinite (southern Mexico). The diamond-bearing sealed fractures also contain clinochlore, serpentine, quartz, ilmenite and pyrophanite. FIB-TEM and EELS analyses performed on the diamond inclusions suggest that they also have associated amorphous carbon, together with some oxygen-bearing species. Thermodynamic modelling using the EMP chromite analyses obtained across the healed fractures indicate sealing of the fractures in chromite temperatures between 670 °C and 520 °C, during the retrograde evolution of the chromitite. On the basis of these evidences, we propose a model of diamond formation in reduced low-P and low-T environments. The diamonds would precipitate from reduced C-O-H fluids infiltrating from the host peridotite at the onset of serpentinization processes.

These findings warn us about the use of diamonds as UHP indicators when they are not associated with other UHP phases.