Goldschmidt 2021 Abstract
https://doi.org/10.7185/gold2021.4690

Hydrothermal Pt mineralization in ophiolitic chromitites

JÚLIA FARRÉ DE PABLO[1], JOAQUÍN A. PROENZA[2], JOSE MARÍA GONZÁLEZ-JIMÉNEZ[3], THOMAS AIGLSPERGER[4], LISARD TORRÓ[5], CRISTINA DOMÈNECH[1] AND ANTONIO GARCIA-CASCO[3]

[1]University of Barcelona
[2]Universitat de Barcelona
[3]Universidad de Granada
[4]Luleå University of Technology
[5]Pontifical Catholic University of Peru

Presenting Author: jfarredepablo@gmail.com

Although experimental work predicts that platinum-group elements (PGE) are soluble in hydrothermal fluids at temperatures <500 ºC during serpentinization in ophiolite complexes, mineralization-mechanisms driving to the formation of hydrothermal epigenetic PGE mineralizations are still poorly understood. In this communication we describe hydrothermal Pt mineralization associated with ophiolite chromitites in ophiolitic complexes from Central Dominican Republic. This mineralization consists of anhedral and heterogeneous Pt-Fe-Ni-rich grains contained in uvarovite- and chromian clinochlore-filled fractures that cross-cut the chromitite mineralization. Geothermometric constraints based on the composition of uvarovite and chromian clinochlore suggests precipitation in the range of 350–150 ºC. Micro-textural observations suggest that the Pt-Fe-Ni-rich grains formed via the coalescence of nanoparticles in the hydrothermal fluids. Thermodynamic modeling of Pt solubility and mobility within this thermal range indicates Pt is mobilized as aqueous bisulfide complexes in S-poor highly-reducing hydrothermal fluids. We propose that these types of hydrothermal fluids infiltrated through fractures in the chromitite and precipitated uvarovite and chromian clinochlore, together with scarce Ni-sulfides observed in the samples. The crystallization of these Ni-sulfides dropped the already low S concentration in the hydrothermal fluids and caused the precipitation of native Pt. This process resulted in the refinement of Pt as newly formed hydrothermal mineralization and likely promoted the PGE enrichment in the studied chromitites.