

Heterogeneous PGE signatures in metasomatic sulfides from the Tallante xenoliths

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Peridotite mantle xenoliths entrained in Pliocene alkaline volcanic lavas from Tallante (southeast Spain) display a wide range of compositional and mineralogical heterogeneities. The geochemical and mineralogical variability recorded by the Tallante xenoliths documents the extensive transformation of the subcontinental lithospheric mantle in response to the geodynamic evolution of the westernmost Mediterranean. In this contribution, we report a petrographic-geochemical study of base-metal sulfides (BMS) from a set of “anhydrous” lherzolites, in order to unravel the processes and metasomatic agents governing the mobilization of platinum-group elements (PGE) in the subcontinental lithospheric mantle.

The BMS assemblage consists of pentlandite ± chalcopyrite ± bornite, which are found usually forming composite aggregates hosted in pyroxenes of metasomatic origin. The heterogeneity in geochemical systematics, especially REE, of the sulfide-hosting clinopyroxenes reflects the chromatographic fractionation of an alkaline melt percolating through the mantle wall rocks. Despite their striking homogeneity in texture, major element composition, and microstructural position, sulfides exhibit a wide range of PGE patterns, which cannot be accounted for by crystal-chemical partitioning or fractionation of a sulfide melt. Nano- to micro-sized inclusions of PGM are ubiquitous within sulfide grains, suggesting they exerted a strong control on the PGE distribution of the resulting metasomatic BMS.