

Cu-Zn isotopic variations in the Earth's mantle

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High precision Cu and Zn isotopic compositions (expressed as $\delta^{65}\text{Cu}$ and $\delta^{66}\text{Zn}$ respectively vs stdt) are reported for mantle-derived material: OIBs, MORBs, xenoliths and orogenic peridotites, and minerals separated from therein. MORB samples from the 3 oceans have constant Cu (0‰) and Zn (0.25‰) isotopic signatures. $\delta^{66}\text{Zn}$ in Hawaii correlates with Cr content, suggesting involvement of a Cr-bearing phase, possibly spinel. $\delta^{66}\text{Zn}$ also seems related to the alkali index, and could be explained as reflecting mixture between plume and overlying mantle.

Cu isotopic signatures in peridotites may be highly influenced by interstitial sulfides. Cu isotopes seem to be fractionated in BB layered pyroxenite bands and in garnet (fig). A detailed study on Lanzo shows differing $\delta^{66}\text{Zn}$ values correlated to petrology and tectonic setting. Samples from North Body show low $\delta^{66}\text{Zn}$ similar to nodules from US or Kapvaal. Minerals (Ol, Opx, Cpx) separated from peridotites and lherzolites exhibit generally small fractionation with respect to each other. However spinels display more variable $\delta^{66}\text{Zn}$ depending on the geodynamic environment ("oceanic" vs. "continental").

