Goldschmidt 2024 Abstract
https://doi.org/10.46247/gold2024.24135

Light calcium isotope anomaly among oceanic island basalts as a signal of pyroxenites melting

YANG WANG AND YONGSHENG HE

China University of Geosciences, Beijing

Presenting Author: yangwang@cugb.edu.cn

Light calcium (Ca) isotope anomaly, observed among oceanic island basalts (OIB), has been controversially attributed to either recycling of carbonate, derivation from garnet-rich lithologies, or both [1, 2]. Here we present Ca isotopic data for lavas from the Pitcairn Island and nearby seamounts. The $\delta^{44/42}$Ca variation of this single plume, from 0.30±0.02‰ (2SE, unless specified otherwise) to 0.40±0.02‰, is comparable to the total range observed in OIBs. The variable $\delta^{44/42}$Ca cannot be explained by either post-eruption alteration or magma differentiation, but reflects the presence of at least two groups of primary magmas. One group of lavas showing affinity to recycling of superficial crustal materials exhibits a MORB-like $\delta^{44/42}$Ca, and another group with light $\delta^{44/42}$Ca is akin to pyroxenite-derived melts. Combined with literature data, light Ca isotope anomaly among OIBs mainly reflects incremental contribution of pyroxenite melting and isotope fractionation during melting of garnet-rich eclogite-pyroxenite in upwelling plume sources.

[1] Huang, Farkaš & Jacobsen (2011), *Geochimica et Cosmochimica Acta* 75, 4987–4997.

[2] Eriksen, Jacobsen, Day & White (2024), *Geochimica et Cosmochimica Acta* DOI:10.1016/j.gca.2024.02.011.