Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.16151

Diffusion-induced Li isotopic heterogeneity in the oceanization SCLM peridotites of Tibetan Yunzhug ophiolite

GUANGHAO CUI[1,2], RENDENG SHI[2], JINGSUI YANG[3], QISHUAI HUANG[2] AND XIAOHAN GONG[4]

[1]University of Chinese Academy of Sciences
[2]Institute of Tibetan Plateau Research, CAS
[3]Center for Advanced Research on Mantle (CARMA), Key Laboratory of Deep-Earth Dynamics, Institute of Geology, Chinese Academy of Geological Sciences
[4]China University of Geosciences

Presenting Author: cuiguanghao@itpcas.ac.cn

This paper reports Li isotopic compositions of olivine in the oceanization subcontinent lithospheric mantle (SCLM) peridotites of the Tibetan Yunzhug ophiolite. The result shows systematic changes with relative distance from measuring point to edge of olivine grain. δ^7Li of olivine in dunite decrease from +10.46‰ to +1.33‰ with the relative distance from 26.15μm to 124.71μm (Fig.1A), while Li content shows a weak negative correlation with the relative distance. A negative correlation of δ^7Li and Li content in olivine from dunite and harzburgite indicates recent diffusive ingress of Li into the peridotites (Fig.1B). The extreme heavy isotopic composition required for the seawater or seawater alteration endmember in the mixing model together with mode of Li data of cratonic peridotite, likely due to Li diffusive from seawater into olivine. As in dunite, olivine in a single sample of harzburgites also shows large variations in δ^7Li as a function of distance from grain edge (e.g., 6.01 to 1.73 in sample 14YZ13). Combing the mixing model fits the Li isotope data of abyssal peridotites well, it is suggested that the behavior of Li in the oceanization SCLM peridotites may be controlled by Li diffusive from seawater since Li activity in the liquid-state is over solid-state in transporting Li through the peridotites. This study supports that seawater Li diffusion effect is one of the factors for the heterogeneity of mantle Li isotopes in ophiolites.

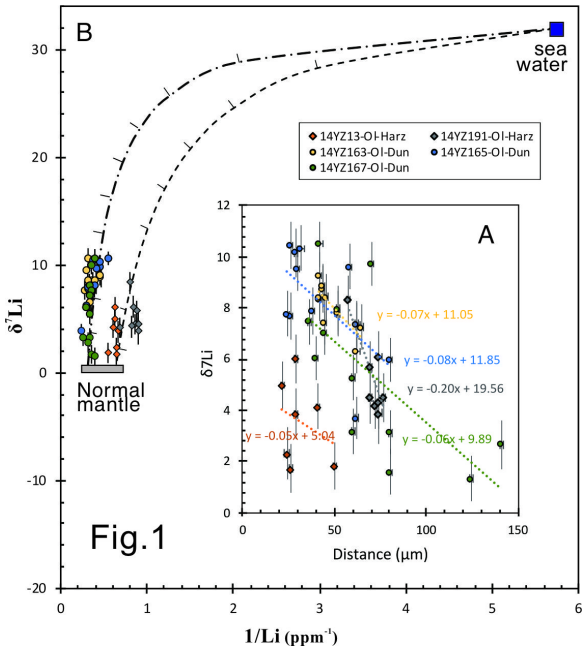

Fig.1