Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.26163

Rodingitization in a forearc setting: A possible another end member to the source of forearc/arc melts

MR. NGANGOM ROMARIO MEITEI, M.SC.[1], OINAM KINGSON[1], KUMAR BATUK JOSHI[2], DEBAJYOTI PAUL[3], M. ASHOK[4], RAJNEESH BHUTANI[4] AND KOSO ARIIO[1]

[1]Department of Geology, Banaras Hindu University
[2]National Centre for Earth Science Studies, Thiruvananthapuram, Kerala
[3]Indian Institute of Technology Kanpur
[4]Department of Earth Sciences, Pondicherry University

Source of fluids invoked during rodingization and their influence on the source of forearc/arc melts are limited and were almost ignored. Here we, for the first time, present whole-rock elemental and Sr-Nd isotopic data in the rodingite and its associated mafic rocks from the Shargole and Nidar ophiolites Ladakh, Himalaya, India, to explore the source of fluids during rodingitization and their possible influence on the source of forearc/arc melts. Numerous rodingite dikes with centimeter to meter scale are intruded in these ophiolites. N-MORB normalised trace element patterns in the rodingites display mild depletion in Nb without any depletion in other high-field strength elements, which are similar with that of the associated mafic rocks (protolith), suggesting their origin in a forearc setting. ε_{Nd}(t=140Ma) in the rodingites are slightly enriched compared to DMM, and are comparable with that of the associated mafic rocks, corroborating their co-magmatic generated in a forearc setting. $(^{87}Sr/^{86}Sr)_i$ in the rodingite are higher (0.7123-0.7177) than the seawater (~0.7091), suggesting that the source could be from the fluid derived from the Tso Morari crystalline complex derived sediments (0.7263). In addition, the source of Ca-rich fluids that invoked during rodingitization could be either from the serpentinite- or carbonate-derived fluids, but we could not differentiate these fluids with the present data. Ti is relatively depleted compared to the protolith mafic dyke and is positively correlated with F in the garnet and apatite of the rodingite, suggesting Ti is mobile and releases during rodingitization in F-rich fluids. The forearc basalts are believed to be depleted in Ti as the source of the forearc basalts are generally metasomatized by subducting slab-derived fluids. But most of the forearc basalt does not show depletion in Ti in N-MORB normalised trace elements patterns. Such scenario could be related to the interaction of the Ti rich fluids released during rodingitization with the forearc mantle source/melts. Na, K, Cs, Rb, Ba, and Sr are also generally released during rodingitization, which could also be one of the end members that leads to the enrichment of these elements in forearc/arc melts.