Full length article

Mineralogy and Geochemistry of Triassic Carbonatites in the Matcha Alkaline Intrusive Complex (Turkestan-Alai Ridge, Kyrgyz Southern Tien Shan), SW Central Asian Orogenic Belt

V.V. Vrublevskii, A.A. Morova, O.V. Bukharova, S.I. Konovalenko

PII: S1367-9120(17)30620-X
DOI: https://doi.org/10.1016/j.jseaes.2017.11.004
Reference: JAES 3297

To appear in: *Journal of Asian Earth Sciences*

Received Date: 2 June 2017
Revised Date: 31 October 2017
Accepted Date: 1 November 2017

Please cite this article as: Vrublevskii, V.V., Morova, A.A., Bukharova, O.V., Konovalenko, S.I., Mineralogy and Geochemistry of Triassic Carbonatites in the Matcha Alkaline Intrusive Complex (Turkestan-Alai Ridge, Kyrgyz Southern Tien Shan), SW Central Asian Orogenic Belt, *Journal of Asian Earth Sciences* (2017), doi: https://doi.org/10.1016/j.jseaes.2017.11.004

Mineralogy and Geochemistry of Triassic Carbonatites in the Matcha Alkaline Intrusive Complex (Turkestan-Alai Ridge, Kyrgyz Southern Tien Shan), SW Central Asian Orogenic Belt

V.V. Vrublevskii[a]*, A.A. Morova[b], O.V. Bukharova[a], S.I. Konovalenko[a]

[a]*National Research Tomsk State University, 36, Lenin ave., Tomsk, 634050, Russia*

[b]*Samara State Technical University, 244, Molodogvardeyskaya str., Samara, 443100, Russia*

Abstract

Postorogenic intrusions of essexites and alkaline and nepheline syenites in the Turkestan-Alai segment of the Kyrgyz Southern Tien Shan coexist with dikes and veins of carbonatites dated at ~220 Ma by the Ar–Ar and Rb–Sr age methods. They are mainly composed of calcite and dolomite (60–85 %), as well as sodic amphibole, phlogopite, clinopyroxene, microcline, albite, apatite, and magnetite, with accessory niobate, ilmenite, Nb-rutile, titanite, zircon, baddeleyite, monazite-(Ce), barite, and sulfides. The rocks share mineralogical and geochemical similarity with carbonatites that originated by liquid immiscibility at high temperatures above 500°C. Alkaline silicate and salt-carbonate melts are derived from sources with mainly negative bulk εNd(t) ~ from –11 to 0 and high initial $^{87}Sr/^{86}Sr$ ratios (~ 0.7061-0.7095) which may be due to mixing of PREMA and EM-type mantle material. Pb isotopic ratios in accessory pyrrhotite ($^{206}Pb/^{204}Pb$ = 18.38; $^{207}Pb/^{204}Pb$ = 15.64; $^{208}Pb/^{204}Pb$ = 38.41) exhibit an EM2 trend. The intrusions bear signatures of significant crustal contamination as a result of magma genesis by syntexis and hybridism. Concordant isotope composition changes of $\delta^{13}C$ (–6.5 to –1.9 ‰), $\delta^{18}O$ (9.2 to 23 ‰), δD (–58 to –41 ‰), and $\delta^{34}S$ (12.6-12.8 ‰) in minerals and rocks indicate inputs of crustal material at the stage of melting and effect of hot fluids released during dehydration of metamorphosed oceanic basalts or sediments. The observed HFSE patterns of the oldest alkaline gabbro may be due to interaction of the primary mafic magma with IAB-type material. The isotope similarity of alkaline rocks with spatially proximal basalts of the Tarim large igneous