

Geochemistry of potassic minerals in the Xiaogulihe-Keluo-Wudalianchi-Erkeshan volcanic rock belt, NE China and their geological implications

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Xiaogulihe-Keluo-Wudalianchi-Erkeshan potassic volcanic rock belt in northeastern China, one of the well preserved volcanic clusters from Pleistocene to Holocene epoch in China, was characterized by the high contents of potassium, alkali and high K_2O/Na_2O ratios in their rocks. They were high potassium peralkaline volcanic rocks with total alkali contents generally ranging from 7.81 wt.% to 10.56 wt.%. Some phlogopite-bearing iherzolit xenoliths and typical potassic mineral of leucites were found through field investigation work and under microscopic work. On the basis of comprehensive geochemistry research work relating the compositions of the whole rocks, crystallization condition of potassic minerals (especially phlogopites, leucites) in hosted volcanic rocks and mantle peridotite xenoliths with the magma component and its source, the authors suggested that the hidden rift in northeastern China and lithospheric extension in the study region should be responsible for the low-degree decompression melting of phlogopite-bearing iherzoliths in the mantle and the potassic magma source had experienced leucites crystallization in shallow crust. As magma evolved, the magma tended to be Na-rich and xenomorphic nepheline and sodalite were observed in matrix glass after the crystallization of lots of potassic minerals. The volatile-rich minerals as leucite, aptite, nepheline, sodalite and phlogopite occurred in volcanic rocks and mantle xenoliths also provided the evidence of high abundance of H_2O , F, Cl and P in the magma prior to eruption.

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