



Geology and Geochemistry of the Yingmailai Granitic Intrusion in the Southern Tianshan and Its Implications

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The Late Permian Yingmailai granitic intrusion is located in the middle part of the southern Tianshan. It consists predominantly of biotite K-feldspar granite with minor two-mica K-feldspar granite. Two types of ellipse-shaped xenoliths including dark-color fine-granular xenolith and light-color granitic xenolith have been recognized in the granitic intrusion. The xenoliths have geochemically similarities to granites. They are characterized by high SiO₂ contents, enrichment of K and total alkali coupled with low MgO and CaO contents. Furthermore, they display the enrichment in Rb, Ba, Th and REE as well as significant fractionation of LREE from HREE, and negative Nb, Ta, Zr and Hf anomalies on the ORG normalized trace element patterns. The similar variation trends of major oxides between granites and xenoliths on the Harker diagram suggest that they were derived from a common parental magma. The A/CNK ratios range from 0.99 to 1.08, meta-aluminous to per-aluminous feature. The chondrite-normalized REE patterns are characterized by strong enrichment of LREE relative to HREE and significantly negative Eu anomalies. In combination with their high (87Sr/86Sr)_t ratios (0.71036 to 0.71585) and negative Nd(t) values (-1.67 to -6.45), it can be inferred that the magmas might be produced by dehydration melting of crust-source amphibole-bearing mafic rocks (<50 km), and that crystal fractionation of biotite and plagioclase with minor magnetite might have occurred before emplacement. The petrological and geochemical characteristics of the granitic rocks suggest that the intrusion is a transition type between A and S types, and formed in the late or end stage of collision between Tarim and Kazakhstan plate in late Permian time.