The Petrology, Geochemistry and Geochronology of Upper Carboniferous Volcanic Rocks in the Eastern Junggar Basin, China

ZHAO XIA[1], YANG JUN[2], WEI YANZHAO[1]

[1] Research Institute of Petroleum Exploration and Development, Petrochina, Beijing, China
[2] Chang'an University, Xi'an, China
(*correspondence: zhaox601@petrochina.com.cn)

Junger Basin is an important part of central Asia orogenic belt. It was located among the intersection of Kazakhstan, Tarim and Siberia plates during Palaeozoic. The research on the basin formation and the volcanos during this period were never stopped because of the complicated structural settings and great breakthough of gas exploration has gained in Carboniferous volcanos.

The volcanic rocks from the Upper Carboniferous are widely distributed in eastern Junggar. Petrology and geochemistry of the rocks indicate that the Upper Carboniferous volcanic rocks are most widely developed, consisting of volcanic lava and volcaniclastic rocks. Volcanic lava have widely varied rock types including basalt-andesite-rhyolite rocks. Their petrogeochemical characteristics indicate that the basalts and basaltic andesites of the formation are high-K calc-alkaline volcanic series. The REE distribution plots show the volcanic rocks are enriched in LREE and LILE, and depleted in Nb, Ta, and high field strength elements (HFSE). The ratios of Th/Nb and Nb/Zr as well as the tectonic setting discrimination diagrams show that the volcanic rock main body is characteristic by intraplate volcanic rock, and formed under the tectonic setting of intraplate extension. The lava of this area with low Th/Nb, low La/Nb, slightly elevated LREE, as well as Nb/La-Th/Nb and La/Ba-La/Nb discrimination diagrams, show that Nb and Ta relative to La depleting was the result of subtractive component adding to volcanic source. The lava with above charcaterisctics, similar with "post collision arc volcanic rock", is generated in an extensional setting of the late stage of orogenesis, but the magma source may be influenced by earlier oceanic plate subduction. All these features suggest that they are immature back-arc basin volcanics related to subduction.

Combining with the regional geologic characteristic, Upper Carboniferous volcanic rocks in eastern Junggar are the products of immature back-arc basin□formed in an extensional rifting setting of the late stage of orogenesis, which is consistent with the region rifting function of large scale.