Natural gas characteristics and origin in the Central and Eastern Junggar Basin, NW China

S.X. ZHOU[1], B.Z. WANG[1,2], J. LI[1,2], S.P. LIU[1,2] AND H.K. ZHANG[1,2]

[1]Key Laboratory of Petroleum Resources Research, Institute of Geology and Geophysics, CAS, Lanzhou, 730000 (*correspondence: sxzhou@lzb.ac.cn)
[2]Graduate University of CAS, Beijing, 1000049

There is abundant natural gas resources occurred in the northwestern, southern, central and eastern area of the Junggar basin. Based on previous studies, natural gases in this basin are mainly derived from Carboniferous, Permian and Jurassic source rocks. In this study, 14 natural gas samples from 5 oilfields located in central and eastern part of this basin have been collected and analyzed for gas components and carbon, hydrogen and noble gas isotopic compositions.

Main constituents of the gases in the central area of Junggar Basin are methane (80.0–94.6%) up to pentane with traces of carbon dioxide and nitrogen. Compared with central area, natural gases in the east part of basin contain more nitrogen and C_2+ heavy hydrocarbons, and less CO_2. Natural gases in Luliang oilfield demonstrate dry gas characteristics, but gases from giant kelameili gasfield in eastern part are wet gas.

The methane carbon isotope compositions range from -35.2‰ to -37.7‰ and methane hydrogen isotope data range from -177‰ to -192‰ in Shinan, Mobei and Mosuowan oilfield in central part of this basin. In the meantime, their $\delta^{13}C_2$ values range from -26.1‰ to -28.2‰; $\delta^{13}C_3$ values range from -24.7‰ to -26.6‰, all these show that gases are main coal-derived gases with Ro in 0.8-0.9%. The isotopically lightest $\delta^{13}C_1$ and δD_1sample was obtained from Luliang oilfields coexist with biodegraded oil, thus gases of this oilfield are secondary microbial gases. But Kelameili gasfield had higher $\delta^{13}C_1$, mostly ranging from -30.0 ‰ to -31.5‰, while $\delta^{13}C_2$ values range from-27.3‰ to -28.6‰, It is showed that natural gases of this gas field are generated from Carboniferous coal-bearing strata.

This work was supported by partly by the Chinese National Major Fundamental Research Developing Project (2006CB202305), the National Special Projects of Science and Technology (2008ZX05018-001-05) and the Chinese National Natural Science Foundation (40572088).

Sm-Nd dating of whole rock and mineral separates from Dangqiong Gabbro, Yarlung–Tsangpo Suture

S. ZHOU[1], X.X. MO[1], R.Z. QIU[2], Z.D. ZHAO[1], S.Q. ZHANG[3], T.Y. GUO[1] AND L. QIU[4]

[1]China University of Geosciences, Beijing, China
[2]Chinese Academy of Geological Sciences, Beijing, China
[3]University of Windsor, Canada
[4]Hubei Land Resources Vocational College, Jingzou,China

Dangqiong ophiolite is one of the main massifs of the Dangqiong-Xiubugabu ultramafic complexes exposed within southern offset in the west segment of the Yarlung–Tsangpo suture zone. Sm–Nd isotope data of plagioclase and clinopyroxene separates and whole rock samples yield an internal isochron age of 373±28 Ma (MSWD =1.5), and an initial εNd (t) value of +3.3. So far most data show Yarlung–Tsangpo ophiolite are remnants of Mesozoic oceanic lithosphere that became trapped along the suture, although there are various kinds ophiolite in age and tectonic setting along different parts of the suture. Except the rather old formation age, Dangqiong ophiolite also shows relatively low Rb concentration and Rb/Sr ratio and OIB-type isotopic affinity in εNd (t)-$(^{87}Sr/^{86}Sr)_i$ space, indicating a distinct geodynamic setting from main Yarlung–Tsangpo ophiolite. In addition, exotic limestone blocks of Permian, Triassic, Jurassic and Cretaceous ages have been found recently in the west segment of the Yarlung–Tsangpo suture zone [1, 2]. Most of these studied rocks show little deformation with slight alteration, and are in fault contact with wall rocks. These rocks, combined with the gabbros, represent a magmatic offspring during an episode of lithosphere extension. This suggests that the Dangqiong ophiolite represents a fragment of Late Devonian Paleo-Tethyan oceanic lithosphere, on top of which are Jurassic-Cretaceous sequences. All these suggest that the geologic assembly including the northern Himalaya block used to be a part of paleo-Asia ocean during the Paleozoic (NSFS No. 40572048, 2009CB421002).