

The Geochemical Characteristics of the Mesoproterozoic Xiamaling Formation from North China

QINGYONG LUO^{12*}, JIN WU¹², LEI ZHU¹²

¹ State Key Laboratory of Petroleum Resources and Prospecting, China University of Petroleum (Beijing), Beijing 102249, China (*correspondence: qingyong.luo@cup.edu.cn);

² College of Geoscience, China University of Petroleum (Beijing), Beijing 102249, China.

The Mesoproterozoic Xiamaling Formation from North China was regarded as one of the oldest hydrocarbon source rocks in China, which may record the significant palaeoenvironmental and biological information from that time. The Xiamaling Formation sediments were collected from Xiahuayuan, Hebei Province. In this study, organic geochemistry and petrology techniques were used to determine the geochemical characteristics of the Mesoproterozoic Xiamaling Formation.

The TOC contents of the studied samples are ranging from 2.17 to 14.10%, averaging 5.55%, indicating that they are very good to excellent source rocks. S_1 and S_2 values in the range of 0.23–1.66 mg HC/g rock and 5.84–62.73 mg HC/g rock, with averages of 0.77 and 21.88 mg HC/g rock, respectively, indicating that they are mostly good to excellent source rocks. HI is falling between 270 to 472 mg HC/g TOC, suggesting that the Kerogen Type is mainly Type II (Peters and Cassa, 1994). T_{max} values ranged from 432 to 442 °C, with a mean of 438 °C, suggesting low maturity of the samples, which is consistent with the solid bitumen reflectance falling between 0.43% and 0.68%.

The maceral composition in the studied samples is mainly composed of lamalginite, solid bitumen and thucholite, in order of abundance. The significant abundance of the lamalginites also implies the oil-prone nature of these rocks, which is consistent with Rock-Eval data. The thucholite is composed of a radioactive mineral particle as the core and surrounding OM, which was formed by ionizing radiation from the radioactive mineral particle.

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