Organic geochemistry characteristics for mudstones in the Permian Zhesi Formation, Eastern Inner Mongolia, China: A new instance showing good hydrocarbon potential in the marine strata

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More and more instances show that the marine strata has an effiective hydrocarbon potential as the terrestrial one did. And the study on the characteristics of organic geochemistry of the Permian Zhesi Formation in eastern Inner Mongolia provides an opportunity to achieve a breakthrough in marine petroleum exploration in northeastern China. The thickness of the mudstones in the Zhesi Formation is about 1000 m and 30 dark mudstone outcrop samples were collected. The values of TOC are distributed in 0.3%~1.67% (average 0.81%). 90% of the values are greater than 0.5% which is taken as the lower limit of the abundance of organic matter, while 20% of the values exceed 1.0%. It suggests that the source rocks are up to the medium-good hydrocarbon potential. The kerogen type is mainly II_2 and the highest pyrolysis temperatures are in the range of 469~549°C. Ro values are between 2.5% and 4.28%. The source rocks are in high to over mature stages. It is worth noting that the geochemical index of the outcrop samples in the study area are similar to the core ones in the Zhesi Formation, Songliao Basin which have been proved to have a good hydrocarbon potential. Therefore the outcrop mudstones in the eastern Inner Mongolia should be considered to be of a good hydrocarbon generated prospect.

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Phase equilibrium for the aqueous system containing ammonium, magnesium and chloride at 323.15 K

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Phase equilibrium and phase diagram can give basic data for crystallization process. In the technology of exploit potassium from Pingluoba underground brine (Sichuan, China), magnesium ion accumulates in the mother liquid to form an aqueous system containing magnesium, ammonium and chloride. In this paper, the solubility of the system was measured using an isothermal solution method at 323.15 K.

Figure 1 is the phase diagram of the system at 323.15 K. The diagram consists of two invariant points, three univariant curves and three crystallization fields corresponding to single salts $MgCl_2 \cdot 6H_2O$, NH_4Cl and the double salt $NH_4Cl \cdot MgCl_2 \cdot 6H_2O$. The incommensurate invariant point E_1 is saturated with salts NH_4Cl and $NH_4Cl \cdot MgCl_2 \cdot 6H_2O$, and the mass fraction of its equilibrium solution is w (NH_4Cl) 7.27 % and w ($MgCl_2$) 25.87 %. The other invariant point E_2 is saturated with salts $MgCl_2 \cdot 6H_2O$ and $NH_4Cl \cdot MgCl_2 \cdot 6H_2O$, and the mass fraction of its equilibrium solution is w (NH_4Cl) 0.30 % and w ($MgCl_2$) 35.98 %. Results show that the salt $MgCl_2$ has salting out effect to the salt NH_4Cl.

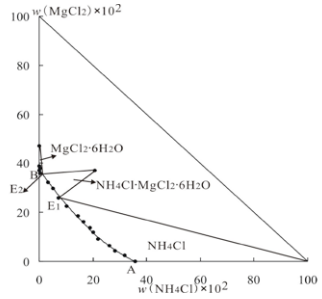

Figure 1 Phase diagram of the system containing ammonium magnesium and chloride at 323.15 K

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