

## POSSIBLE CHEMICAL STRUCTURES AND BIOLOGICAL PRECURSORS OF DIFFERENT VITRINITES IN COAL MEASURE IN NW CHINA

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Some oil and gas wells relate to coals and coaly mudstones have been found in some Jurassic coal-bearing basins in NW China, for instances, in Junggar and Turpan-Hami basins in recent years (Huang et al., 1995; Wang et al., 1996). But little oil has been found in any Carboniferous-Permian coal-bearing basin (Huang, 1991), such as Ordos basin in NW China, though it contains large quantity of coal reserves and natural gases originated from coals. Since hydrocarbon generation capacity and character of huminite may be dominated by that of vitrinite, it's necessary to study structure of different vitrinites in order to further understand the mechanism of coal formed oils at molecular level.

Low matured coals are acquired from Junggar, Turpan-hami Jurassic basins and Ordos Carboniferous- Permian basin in NW China. Isolation of vitrinites is succeeded by hand pick from vitrains since vitrinite is the dominant maceral in coals. Purities of vitrinites are not less than 90% examined using microscope.

Most desmocolinites in Junggar, Turpan-hami basins (e.g. JD1) have similar NMR spectra that show sharp methylene peaks at about 30 ppm. Aliphatic peaks in NMR spectra of Jurassic telocollinites (e.g. TT1) are high, but those gas-prone carbons, such as terminal methyl carbon and alpha methyl carbon on aromatic rings (0-25 ppm), are in big proportion (Fig. 2). And this indicates more side chains and less long chain aliphatics in structure of TT1 telocollinite than desmocolinite. Vitrinites in Carboniferous-Permian Ordos basin (e.g. OD1) are mainly composed of desmocolinite. Since the maturity of OD1 is 0.60%, apparently higher than that of Jurassic vitrinites, the aliphatic peak is lower and the aromatic peak is higher. But the shape of aliphatic peak of OD1 is similar to that of TT1, which indicates OD1 vitrinite is mostly gas-prone, though it is mainly composed of desmocolinite.

Most vitrinites in Junggar, Turpan-hami basins have high C<sub>6+</sub> production in pyrolysates (Fig. 1). And proportion of each component differs from each other in pyrolysates of vitrinites. It shows that relative proportion of aliphatics, such as *n*-alkanes/*n*-alke-1-nes, is high in pyrolysates of hydrogen-rich desmocolinites in Junggar, Turpan-Hami basins. But aromatics and alkylphenols are dominant production in pyrolysates of Jurassic hydrogen-rich telocollinite. And also aromatics and phenols are primary production while aliphatic hydrocarbons are in

little proportion in pyrolysates of vitrinites in Ordos basin though vitrinites are mostly consisted by desmocolinite.

The distributions of phenols in the pyrolysates of vitrinites at the same maturation level are similar, which indicates phenols originated from lignins, the most abundant constitute of wood in vascular plants. Similar distribution of *n*-alkanes/*n*-alk-1-enes distributions presented in pyrolysates of desmocolinites in Junggar and Turpan-hami basins, which showing maxima at  $nC_{21}\sim nC_{23}$ . Existence of long side chain (up to  $C_{25}$ ) alkylbenzenes is significant character of hydrogen-rich desmocolinite in Junggar and Turpan-hami basins. It shows that “linear” alkylbenzenes are more abundant in hydrogen rich desmocolinites in Junggar and Turpan-hami basin than in other vitrinites.

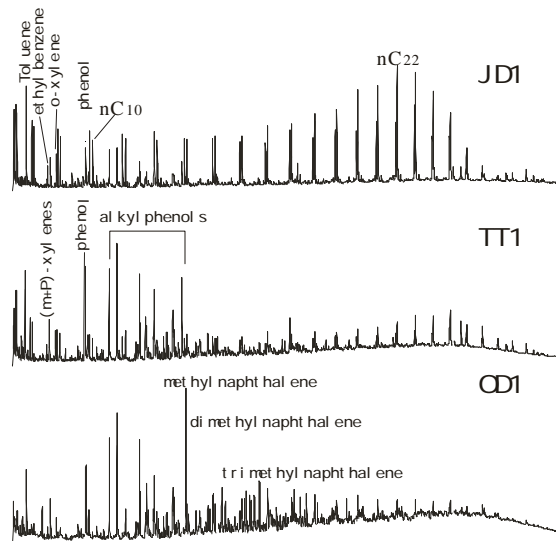


Figure 1. TIC spectra of pyrolysates of several typical vitrinite

Pyrolysates of alganites, cutinite, sporinite and subrinite have been checked for the comparison with Jurassic desmocolinite in Northeast China, thus to discuss the precursor of extra high aliphatics component in pyrolysates of the desmocolinite. It shows that long chain aliphatics are in high abundance in the structure of suberinite (Khorasani and Michelsen, 1991), and it may be the source of long chain aliphatics in desmocolinite in Jurassic coal-bearing basins in NW China.

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