

## **EXPERIMENTAL STUDY ON EXISTENCE OF HYDROCARBON UNDER HIGH PRESSURE AND TEMPERATURE IN DEEP LITHOSPHERE**

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Pyrolysis of lignite was conducted at high temperatures from 400 °C to 700 °C and high pressures 1 GPa and 3 GPa in a closed system in order to investigate pressure and temperature effects on organic matter maturation. The liquid and solid pyrolysate were measured by GC/MS. The data indicated that the total yield of liquid hydrocarbons decreased with increasing pressure and the maximum of production was obtained at a higher temperature. At a given pressure, organic matter has a more mature characteristic with increasing temperature. Increasing pressure significantly controls all aspects of organic matter metamorphism, including hydrocarbon generation, maturation and thermal destruction. Considerable amount of liquid hydrocarbons with the carbon number up to C<sub>35</sub> and the isoprenoid hydrocarbon, which is considered extinct exceeding the “dead line” for liquid petroleum, with relatively low thermal stability, were found at 3 GPa and 700 °C, which are much higher than the threshold of the traditional model for organic matter evolution. The experimental results demonstrated that the relative abundance of high molecular weight hydrocarbons may exist under the conditions of the lower lithosphere, which not only breaks through the traditional concept that alkanes mainly present at stage of “oil window”, but also enhances the possibility to find the oil in the high temperature and pressure areas.