

## **Significances on relationships between pyrolysis parameters and organic matter occurrence in source rocks**

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Argillaceous source rocks and  $<2\mu\text{m}$  clay-sized fractions were selected from the Shahejie Formation in Eocene of the Dongying Sag, and the variations in characteristics of pyrolysis (Rock Eval-VI), IR, and XRD after the chloroform and disodium peroxodisulfate ( $\text{Na}_2\text{S}_2\text{O}_8$ ) treatments were compared in order to reveal the relationships between pyrolysis parameters and OM occurrence and its significance for the OM evolution and hydrocarbon generation.

Comparing the pyrolysis parameters (TOC, PC, RC,  $S_1$ ,  $S_2$ ) of 263 bulk rock with that of clay-sized fractions, it is found that the pyrolysis parameters of the clay-sized fractions were all higher than that of bulk rocks, and the coefficient of correlation between bulk rocks and clay-sized fractions is over 0.8, indicating that the clay-sized fraction contribute the most to the OM and hydrocarbon generation of bulk rock. A total of 15 clay-sized fraction samples were selected to procedurally treated with chloroform and  $\text{Na}_2\text{S}_2\text{O}_8$  and performed the pyrolysis measurement. It indicates that the TOC, PC, RC,  $S_1$ ,  $S_2$  after chloroform treatment were decreased by 20%, 35%, 8%, 94% and 29%, respectively; and the TOC, PC, RC,  $S_1$ ,  $S_2$  after  $\text{Na}_2\text{S}_2\text{O}_8$  treatment were decreased by 95%, 95%, 95%, 100% and 100%, respectively; these characteristics suggest that the OM in clay-sized fraction is the main contributor to the hydrocarbon generation parameters (e.g., PC,  $S_2$ ). After the clay-sized fractions were determined by XRD and IR, it is found that over 3100 m the OM within interlayer of smectite is abundant, and below 3100 m the OM is predominately combined with other minerals, which indicates that the characteristics of minerals adsorbing OM are varied with burial depth.

Integrated above analysis, it can be seen that  $S_1$  is occurred as free state hydrocarbon decreased by 94% after chloroform treatment, and  $S_2$  (PC) is the hydrocarbon adsorbed on clay-sized minerals, decreased over 95% after  $\text{Na}_2\text{S}_2\text{O}_8$  treatment. These characteristics indicate that the interaction between minerals and OM is significant to the OM hydrocarbon generation.

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