

Formation and Hydrocarbon Generation Characters of Organic Acid Salts in Marine Carbonates

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To study the formation of organic acid salts in marine carbonate and its hydrocarbon generation characteristics in marine strata, simulated experiments of reaction of acetic acid and stearic acid with calcium carbonate and hydrocarbon generation simulated experiment of calcium carbonate were conducted.

Results showed that the morphology of reaction product of calcium carbonate with acetic acid is different from that of calcium carbonate, and the X-ray diffraction (XRD), raman and Fourier Transform Infrared spectroscopy (FTIR) characteristics are also different from that of calcium carbonate, while same as that of calcium acetate. The morphology of reaction product of calcium carbonate with stearate acid is similar with calcium carbonate, and XRD, raman and FTIR curves show some characteristics of calcium stearate with some features of calcium carbonate. No matter short chain organic acid or long chain organic acid could react with calcium carbonate, forming organic acid salts. However, reaction type is different between short chain organic acid and long chain acid. Due to acidity of acetic acid is relative strong, it can dissolve calcium carbonate. While acidity of stearate acid is relative weak, it adsorbs on the surface of calcium carbonate, forming salt with coordination bond.

Hydrocarbon generation simulated experiment results of calcium carbonate showed that there are one peak of liquid hydrocarbon generation at 375°C and one peak of gaseous hydrocarbon generation at 500°C, with total hydrocarbon generation up to 495kg/tc. Organic acid salts are characterized by generation gaseous hydrocarbon at high temperature by cracking.

Since much stable than organic acid and hydrocarbon, organic acid salts crack at higher temperature, thus being an import hydrocarbon source in high mature marine carbonates rocks strata. Organic acid salts occur dispersedly in marine carbonate strata, which have great influence on hydrocarbon generation rate and process of carbonate source rocks. Study on the formation, quantity and hydrocarbon generation characteristics of organic acid salts in different evolution stages have important significance on carbonate evolution pattern study, carbonate source rocks evaluation.