The genetic feature and reservoir forming model of cracked gas in China

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Comprehensive research the domestic and foreign research fruit on cracked gas, further analyze the genetic features and reservoir forming differences of cracked gas among crude oil, marine facies source rock, lake facies sapropel type source rock and lake facies humic source rock.

Crude oil crack is the break of long chain fatty structure carbon. It begin to crack when the earth temperatures go beyond 180°C, the crack depth is deep, so its reservoir forming mainly controlled by palaeohigh. Source rock crack is the break of aromatics methyl and terminal methyl in kerogen structure. The gas generation potential of marine sapropel type would dry up when Ro near to 3%, but the gas generation potential of lake facies sapropel type source rock would generate about 201m^3/ton TOC when Ro near 3% to 5%. From simulate experiment, the gas-generating amount is about twenty percents of total [1]. Evolutionary trend of kerogen H/C atomic radtio may reflects that the coal still have large gas generation potential although it is in post-mature stage (Figure 1). The crack potential of lake faces sapropel type is between them and is controlled by the degree of sapropel type. as a whole, it is one of most important cracked gas source rock type. Source rock crack is controlled by the centre of generate hydrocarbon. transforming and reservoir condition are very important.

Divide cracked gas into four reservoir forming model, crude oil cracked gas palaeotectonic control reservoir, marine source rock cracked gas carbonate reef flat-unconformity control reservoir, lake facies source rock conventional and cracked mixed gas structure control reservoir and lake facies source rock cracked gas special lithology control reservoir.

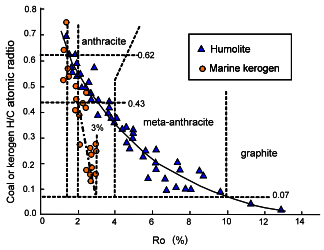

Figure 1: Relation of Coal or kerogen H/C atomic ratio with Ro

[1] Li Jian, Hu Guoyi, *et al*. (2001) *The Physical Chemistry Simulation Research of Gas Pool Forming in Large and Middle Scale Gasfileds in China*. Beijing: Petroleum Industry Press.

Carbon dioxide sequestration within Jinchuan copper-nickel mine tailing, China

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Anthropogenic greenhouse gas emissions may be offset by carbon dioxide mineral sequestration, which through the carbonation of magnesium silicate minerals to form magnesium carbonate minerals, and the ultramafic-hosted mine tailings are the ideal raw material for carbon dioxide mineral sequestration. Tailings that can be used to sequestrate carbon dioxide include copper-nickel mine tailings, chrysotile mine tailings, serpentine mine tailings, and V-Ti-magnetite mine tailings in China. We emphasis on particle size, mineral composition, major elements and trace elements, and the potential and capability of natural weathering for carbon dioxide sequestration in Jinchuan copper-nickel mine tailing. Jinchuan is located in central section of Gansu, China (38° 29' N, 102° 10' E) at elevation of 1563. To examine the capability of carbon dioxide fixed in Jinchuan copper-nickel mine tailing, a tailing profile was dug in NO. 1 tailing dam and 9 samples were collected at 10 cm intervals, and 5 other samples were collected from NO. 2 tailing dam. Analyses included particle size, XRF, FT-IR, XRD, and selective leaching, and we find that lansfordite content in NO. 1 and NO. 2 tailing dam is 4.19 wt% and 1.95wt% respectively. According to our preliminary estimate, 706.8 Kt CO_2 were sequestrated during the period of natural weathering in the Jinchuan copper-nickel mine tailing. Our study also indicate that the natural weathering of Jinchuan copper-nickel mine tailing are in abiotic environment, for lansfordite is formed in abiotic environment, and the main reasons may be drought condition, low temperature in Jinchuan, and the microenvironment of serpentine tailing have a high magnesium concentration, which will restrain the metastasis of bacteria. On the basis of tailing reserves and concentration of magnesium, it is about 40 Mt of carbon dioxide that could be fixed in Jinchuan copper-nickel mine tailing. Therefore, the potential of carbon dioxide that could be sequestrated in Jinchuan copper-nickel mine tailing is considerable. And the concentration of Ni, Cr and Cu are 2494 μg/g, 3094 μg/g and 1731 μg/g, hence comprehensive utilization of Ni, Cr and Cu would greatly cut down the investment of carbon dioxide sequestration.

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