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利用包裹体中气体地球化学特征与源岩生气模拟实验探讨鄂尔多斯盆地靖边气田天然气来源

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摘要:

鄂尔多斯盆地上、下古生界地层包裹体气体与气藏中气体地球化学性质对比表明: 上古生界气藏中气体与包裹体中气体地球化学性质相似, 气藏中气体的地球化学性质能代表成藏初期气体的原始特征; 而下古生界气藏中气体与包裹体中气体的地球化学性质差别很大, 下古生界气藏中的气体与下古生界源岩模拟生成气体也有非常大的差别。因此, 下古生界气藏中的气体不能代表来自下古生界源岩产生天然气。结合前人关于奥陶系源岩的模拟生成天然气、包裹体中气体以及靖边气田天然气的地球化学特征, 提出来源于奥陶系的天然气应具有 $\delta^{13}\text{C}_1 < -38\%$ 、 $\delta^{13}\text{C}_2 < -28\%$ 的特征。下古生界地层包裹体中气体与气藏中气体地球化学性质对比表明, 下古生界气田天然气乙烷碳同位素的变化范围也比甲烷碳同位素的变化范围大很多, 乙烷碳同位素不适合作为判断靖边气田天然气来源的标准。在此基础上, 以上古生界天然气甲烷碳同位素的平均值(-32.90%)与下古生界 $\delta^{13}\text{C}_1 < -38\%$ 天然气甲烷碳同位素的平均值(-39.04%)分别作为上、下古生界来源天然气甲烷碳同位素的界限值, 通过简单计算认为靖边气田大约85%的天然气来源于上古生界煤系。

英文摘要:

The geochemistry comparison of the gas from inclusions and that of pool gas show that the geochemistry of pool gas found in Upper-Paleozoic formation is similar with that of the gas from inclusion. So, the pool gas may equal the original gas found in upper-Paleozoic formation in Ordos basin. There is great difference of geochemistry between the gas from inclusions and the gas from Lower-Paleozoic gas pool. The geochemistry of Lower-Paleozoic pool gas is also different to that of the gas produced by source rock pyrolysis. So, the Lower-Paleozoic pool gas could not reveal the original gas when the gas pool formation. The gas which come from Lower-Paleozoic source rock in Ordos basin have a characteristics with  $\delta^{13}\text{C}_1 < -38\%$ ,  $\delta^{13}\text{C}_2 < -28\%$  by comparing the geochemistry of the gases from inclusions, the gases from Lower-Paleozoic source rock pyrolysis and the gases from Jingbian gas field. The analysis to geochemistry of gas from inclusion and that from Lower-Paleozoic gas pools suggest that shift range of  $\delta^{13}\text{C}_2$  is wider than that of  $\delta^{13}\text{C}_1$ . So, the authors suggest that the  $\delta^{13}\text{C}_2$  is improper as a criterion judging the Lower-Paleozoic gas origin.  $\delta^{13}\text{C}_1$  average of methane ( $\delta^{13}\text{C}_1 = -32.90\%$ ) from Uupper-Paleozoic gas pools and the  $\delta^{13}\text{C}_1$  average ( $\delta^{13}\text{C}_1 = -39.04\%$ ) of Lower-Paleozoic gas with  $\delta^{13}\text{C}_1 < -38\%$  should be consider as the indexes of the gases originated from Upper and Lower-Paleozoic source rock, respectively. Ultimately, the authors concluded that about 85% gas in Jingbian gas field come from Upper Paleozoic coal-bearing source rock.

关键词: [下古生界](#) [包裹体气体碳同位素](#) [气源](#) [鄂尔多斯盆地](#)

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