

Gas accumulation process of Anyue gas field in Sichuan basin in China

XIE ZENGYE^{1,2}, WEI GUOQI^{1,2}, LI JIAN^{1,2}, WANG ZHIHONG^{1,2}, DONG CAIYUAN^{1,2}, HAO AISHENG^{1,2}, ZHANG LU^{1,2}, GUO JIANYING^{1,2}, YANG CHUNLONG^{1,2}

¹ PetroChina Research Institute of Petroleum Exploration & Development, Langfang, 065007, China

² Laboratory of Gas Reservoir Formation & Development, CNPC, Langfang, 065007, China

Anyue gas field is the biggest marine gas field ever found in China with at least 1.5×10^{12} m³ gas resource. Proven gas resource discovered in the upper Sinian Dengying formation and lower Cambrian Longwangmiao formation is 8487×10^8 m³. Scholars had done a lot of study on gas source and accumulation geological conditions. However, study on the accumulation process was mainly based on geological analysis. This paper focused on gas accumulation process of Anyue gas field through fluid inclusion, organic petrology of reservoir solid bitumen, isotopic kinetics and tectonic evolution history study.

High abundance of liquid hydrocarbon inclusions in Sinian-Cambrian reservoir indicates large amount of liquid hydrocarbon migrated into reservoir rock during oil generation peak period. This is an important evidence of paleo oil reservoir existence. Low abundance of hydrocarbon inclusion in Xishan period indicates that liquid hydrocarbon cracking gas mainly accumulated through short-distance adjustment without large-scale migration of hydrocarbon.

Distribution of Sinian-Cambrian reservoir rock solid bitumen in Anyue gasfield is closely related with paleo structural background. Solid bitumen abundance of reservoir rock decreased from 0.25~3.50% at higher part to 0.1~0.2% at lower part of paleo uplift. Solid bitumen abundance in reservoir rock is an evidence of paleo oil reservoir.

Isotopic kinetic study shows that gas in Dengying and Longwangmiao gas reservoir is liquid hydrocarbon cracked gas during 195~160Ma which accounts to 60%~83% of total liquid hydrocarbon cracked gas.

In all, it is considered that the process of Anyue gas field forming is classified into four phases: paleo-oil reservoir, large scale paleo-gas reservoir and paleo-gas reservoir reforming. Gas in Anyue gas field is liquid hydrocarbon cracked gas during 195~160Ma which accounts to 60%~83% of total liquid hydrocarbon cracked gas.

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