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Determination of gas content in shale by adsorption and desorption experiment

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Shale gas is a natural gas accumulation mainly located in shale rock series, with adsorption and free state as the main modes of existence, whose content directly affects the cumulative production, gas well's productivity and life, and is an important index for selection of exploration blocks and reservoir's evaluation. The determination methods of gas content in shale mainly include desorption method, isothermal adsorption and logging interpretation. In this paper, desorption method is adopted in production experiment with pressure reducing to study the gas content in shale. The results show that the production process of shale gas can be divided into three stages, namely, the lost gas escaping stage, the rapid desorption stage and the slow desorption stage. The production rate is the highest in the initial stage of pressure-reducing production. After entering the stable production period, the gas production rate remains stable but the stable period is short, and then the gas production rate gradually decreases. The proportion of gas loss in shale decreases with the increase of pressure drop rate, accounting for 40%~50% on average, so the core should be lifted quickly during the coring process in the field to reduce the gas loss. In this paper, the experimental method of restoring shale to its original state and then producing with pressure reducing is helpful to improve the accuracy of gas content determination in shale, and can provide basis and reference for the actual exploitation of shale gas.

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Primary author: Dr GUAN, Jian (China University of Petroleum(East China))

Co-authors: Prof. LI, Songyan (China University of Petroleum(East China)); Ms WANG, Xiaobing (China University of Petroleum(East China))

Presenter: Dr GUAN, Jian (China University of Petroleum(East China))

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