Genesis of strong kaolinization in ore-bearing sandstone from Mengqiguer uranium deposit, Yili Basin, China

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Abstract: Mengqiguer uranium deposit takes up a unique position for its high grade and its complex mineralization in all sandstone type uranium deposits. According to the analysis results, strong kaolinization is universal in target stratum of Mengqiguer deposit, and the kaolinite content occupies 58% to 86% of clay minerals. The average of organic matter vitrinite reflectance (R_o) for Mengqiguer deposit is 0.612, which shows that the maturation of organic matter and coal measure strata is still in immature to low mature in evolutionary stages and biological hydrocarbon-generating stage. Hydrocarbon inclusions were found in ore-bearing sandstone, which indicates that the target stratum corroded by organic acidic liquids derived from the coal measure strata. The results reveal that the additive effects of organic acid-rich fluid exudation during sedimentation-diagenesis stage and surface water infiltration of post-diagenetic stage are the fundamental factors for strong kaolinization in target stratum, and the reducing fluid, such as coal-formed gas, is closely related to formation of rich and large uranium ore body.

Keywords: Mengqiguer deposit; kaolinization; organic acidic fluid; hydrocarbon inclusion; coal-formed gas