松辽盆地南部幔源CO_2与油气充注时序-来自含片钠铝石砂岩的证据

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Charging time sequence of mantle CO_2 and hydrocarbon in southern Songliao Basin: an evidence from dawsonite-bearing sandstones

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摘要 沉积盆地中幔源CO_2的充注时间是进行CO_2-砂岩相互作用以及CO_2-原油相互作用研究的基础。一般将CO_2气藏附近火山岩的喷发年龄视为幔源CO_2的充注时间,但是,这一思路明显不适合于具有多期火山活动的含油气盆地。通过成岩共生序列和流体包裹体的系统研究,在松辽盆地南部含片钠铝石砂岩中解读出两期油气和一期CO_2充注记录,其中,第一期和第二期油气充注记录主要以液烃包裹体和气液烃包裹体形式赋存于自生矿物和碎屑矿物的裂隙中,幔源CO_2充注的记录为片钠铝石自生矿物和赋存于碎屑矿物裂隙中的含CO_2包裹体,幔源CO_2的充注略晚于第二期油气充注或与其大致同时。根据含片钠铝石砂岩的成岩共生序列和流体包裹体研究,结合已有的油气成藏时间和构造裂缝发育时间判断,松辽盆地南部形成片钠铝石的幔源CO_2的充注时间可能为白垩纪末(明水期末)-古近纪。

关键词: 充注时序 幔源CO_2 油气 含片钠铝石砂岩 松辽盆地南部

Abstract: Charging time of mantle CO_2 in sedimentary basins is a basis for studying interaction of CO_2-sandstone and CO_2-crude oil.Generally,eruption age of volcanic rocks near CO_2 reservoirs is supposed to be the charging time of mantle CO_2,but this approach is obviously not suitable to hydrocarbon basins with multi-stage volcanic eruption.Two hydrocarbon charging phases and one CO_2 charging phase have been identified in the dawsonite-bearing sandstone by the systematic observation and determination of diagenetic sequence and fluid inclusions in Southern Songliao Basin.The first and second hydrocarbon charging were recorded by the liquid hydrocarbon inclusion and gas-liquid hydrocarbon inclusion within fractures of authigenic minerals and detrital minerals,while the mantle CO_2 charging by the dawsonite and CO_2-bearing inclusion within fractures of detrital minerals.The charging time of mantle CO_2 is slightly latter than or approximately the same as the second phase of hydrocarbon charging.According to the analysis of diagenetic sequence and liquid inclusions in dawsonite-bearing sandstone,and in combination with the timing of hydrocarbon accumulation and structural fractures development,the charging time of mantle CO_2 leading to dawsonite formation in Songliao Basin might be from the end of Cretaceous (the end of Mingshui period) to Paleogene.

Keywords: charging time sequence mantle CO_2 hydrocarbon dawsonite-bearing sandstone southern Songliao Basin

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