CH4—H2O体系流体包裹体拉曼光谱定量分析和计算方法　　点此下载全文

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摘要：

　　CH4—H2O体系流体包裹体研究对含油气盆地流体分析和成矿流体研究都有重要的意义。本文详细介绍了H2O、CH4和ICH4—H2O体系的拉曼光谱特征及分子作用，分析了CH4—H2O体系热力学特征，同时对CH4—H2O体系流体包裹体拉曼光谱定量分析和计算的方法及步骤进行了叙述。利用人工合成流体包裹体建立甲烷浓度与拉曼特征峰面积比值之间的校正曲线是实现CH4—H2O体系流体包裹体定量分析的基础。盐度对包裹体定量分析的影响最为显著，在恒定甲烷浓度下，甲烷与水的拉曼峰面积比值随着盐度增加而减少。对于流体包裹体封闭体系，随温度升高，液相甲烷浓度增大。校正曲线必须包含对温度和盐度的校正。石英主矿物性质和方位对甲烷浓度定量分析的影响可以忽略。实验研究表明，原位拉曼光谱技术是准确获取流体包裹体中甲烷水合物生成条件的一种有效方法。因此，基于拉曼光谱分析和显微测温分析结果，采用热力学模型可以定量计算CH4—H2O体系流体包裹体的相关参数。

关键词： CH4—H2O体系　流体包裹体　拉曼光谱　定量分析　人工合成流体包裹体

Method of Raman Spectroscopic Quantificational Analysis and Computation for Fluid Inclusions in CH4—H2O System　Download Fulltext

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Abstract:

　　The study of fluid inclusion in CH4—H2O system is very important to analysis of petroliferous basin, so it is necessary to quantificationally analyze fluid inclusions in CH4—H2O system. The Raman spectroscopic characteristics and molecule interaction of H2O, CH4, and CH4—H2O system were introduced in detail, including the thermodynamics properties of CH4—H2O system analyzed in this paper. The procedure to quantificationally analyze fluid inclusions in CH4—H2O system by Raman spectroscopy was carefully described. The calibration curve can be established based on methane concentration and Raman intensity ratio, which were got from synthetic fluid inclusions. It is just an available way to realize and ensure Raman spectroscopic quantificational analysis of fluid inclusion in CH4— H2O system. The salinity affects the results remarkably, and the Raman intensity ratio of methane to water decreases with adding salt when the concentration of methane is a constant in liquid phase. The concentration of methane in liquid phase increases with temperature rising in fluid inclusion as a closed system. The property and orientation of quartz do little effect on obtaining the concentration of methane in fluid inclusion. The results of experiments show that in situ Raman spectroscopy is an effective method to obtain the formation condition of methane hydrate in fluid inclusions. Based on the results of Raman spectroscopy and micro thermometry, we can compute the parameters of fluid inclusion in CH4— H2O system by the equation of state.

Keywords: CH4—H2O system　fluid inclusion　Raman spectroscopy　quantificational analysis　synthetic fluid inclusion

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