

The Raman Spectra in Fluid Inclusion of Carbonate Reservoir

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ABSTRACT: This paper presents the applications of the spatial scanning Raman spectra method in fluid inclusion of carbonate reservoir. we have examined some inclusions of carbonate reservoir by microscopic confocal Raman spectral methods. In experimental process, X-Y scanning and depth profile(Z scanning) have been finished around the inclusion, sample temperature: 18 °C, -40 °C, -80 °C and -170°C. Because the size of some inclusions are relatively small or inclusions were hidden deeply in sample, their Raman spectra signals were often buried in some noises and other signals which stem from main mineral. The experimental result show that the original experimental spectral curve of the inclusion does not almost distinguish from the original experimental spectral curve of pure main mineral (rock core) when relative large size of confocal pinhole was used. We have first discuss the resolution of confocal Raman spectroscopy on the lateral direction. It is found that the number aperture(N.A.) and the fill factor of objective are important two factors and the size of confocal pinhole does not directly contribute to the performance of lateral resolution. The resolving ability of microscopic confocal Raman spectroscopy in the longitudinal direction has been discussed by considering confocal pinhole, aberration and absorption caused by sample.

To overcome above-mentioned difficulty, we have used relative small size of confocal pinhole. Interfering spectral signal belong with main mineral can be removed, and the inclusion spectrum can be purified by removing artifacts.

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