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Surface Roughness and Micromorphology of Carbonates Dissolved in Three Different Acids by Multifractal Analysis

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The effects of the mineral components on the dissolution of limestones and dolomites, is still in contention. The objective of this study was to determine the effect of different dissolution conditions on the surface micropores of carbonate rocks, providing new insight into the evaluation of petroleum reservoir rocks. Carbonate dissolution dynamics is described in terms of mineral compositions and the microstructures of carbonates. Carbonate dissolution at 30℃, 50℃ and 90℃ under constant pressure was investigated using H2SO4, HCl and HCN. Images of microspace of the carbonate pores, the images of roughness of the rock surface, and the element distribution patterns before and after the acid dissolution were obtained using ESEM (Environmental scanning electron microscope). Highly polished surfaces of limestone specimens were examined before and after acid dissolution. Images of the microspace of carbonate pores and the roughness of the carbonates were investigated using monofractal and multifractal methods to calculate the multifractal parameters. Both the maximum peak-to-valley height *R*t and the width of multifractal spectrum Δ*α* of the roughness and microspace of carbonates vary with the mineral components and the acid types. Actually, the temperature conditions do not affect the dissolution a lot, but the acid reaction-rates are closely associated with the difference of the elements and the variation of the roughness to a certain degree.

Key Words: Surface Roughness; Carbonates; Multifractal; Acid dissolution

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