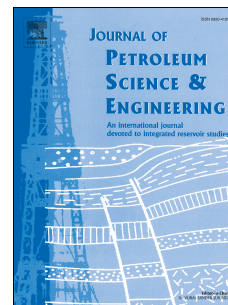


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The splicing of backscattered scanning electron microscopy method used on evaluation of microscopic pore characteristics in shale sample and compared with results from other methods

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Abstract

The splicing of backscattered scanning electron microscopy (SB-SEM) method was applied to evaluate the microscopic pore characteristics of the Lower Silurian Longmaxi Shale samples from Py1 well in Southeast Chongqing, China. The results from SB-SEM, including frequencies, volumes and specific surface areas of organic and inorganic pores with different sizes, were compared with those of low temperature nitrogen adsorption/desorption (LTNA) and mercury intrusion porosimetry (MIP). The results show that the changes in organic and inorganic surface porosity with increasing image area estimated from the SB-SEM method become almost stable when the SB-SEM image areas are larger than 0.4 mm^2 , which indicates that the heterogeneities of organic and inorganic pore volumes in shale samples can be largely overcome. This method is suitable for evaluating the microscopic pore characteristics of shale samples. Although the SB-SEM underestimates the frequencies, volumes and specific surface areas of pores smaller than its resolution, it can obtain these characteristics of pores larger than 100 nm in width, which are not effectively evaluated by the LTNA method and are underestimated by the MIP method.

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