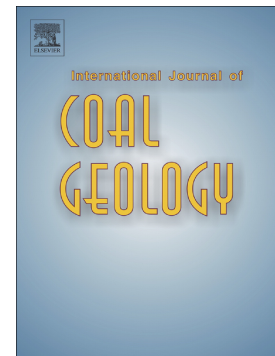


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**Pore characteristics of Longmaxi shale gas reservoir in the Northwest of Guizhou, China:
Investigations using small-angle neutron scattering (SANS), helium pycnometry, and gas
sorption isotherm**

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Abstract: Small-angle neutron scattering (SANS), helium pycnometry, and low-pressure gas sorption isotherm experiments were used to investigate the pore characteristics of Longmaxi shale, the leading producing formation in China. This work is the first microstructural study of Chinese marine shales by neutron scattering technique. The polydisperse spheres model (PDSP) was used for SANS data analysis to obtain porosity and pore size distribution (PSD), and the results were compared with those from gas (CO₂, N₂) adsorption and helium pycnometry. By evaluating the difference of porosities determined from these methods, the closed fraction of shale pores are derived and discussed. Moreover, the porosity has a positive correlation with total organic carbon (TOC) in Longmaxi shale samples. The fractal dimension of shale samples was derived, and results indicated that Longmaxi shale is a mass fractal. A lower mass fractal dimension means less closed pores with correspondingly more open structures.

Keyword: shale gas; pore characteristics; small-angle neutron scattering; helium pycnometry; gas

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