

论文

基于小角X射线散射构造煤孔隙结构的研究

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摘要:

为研究不同变形程度构造煤的孔隙结构特征, 采用小角X射线散射(SAXS)和低温氮吸附相结合的方法, 分析了重庆中梁山南矿不同类型构造煤的孔径、孔体积、比表面积和表面分形维数等参数的变化规律。SAXS研究结果表明, 随着煤的变形程度增强, X射线散射强度增大, 煤中微孔比例增加, 最可几孔径减小, 孔隙表面分形维数增大, 这与低温氮吸附的结果一致。但由于两种方法的测试原理不同, SAXS所测孔隙比表面积高出低温氮吸附结果1~2个数量级。

关键词: 小角X射线散射; 构造煤; 孔隙结构; 低温氮吸附; 分形维数

Pore structure in tectonically deformed coals by small angle X-ray scattering

Abstract:

In order to get deep insight into the pore structure of tectonically deformed coals at different deformation extents, pore parameters(pore size and volume, surface area and surface fractal dimension) of coals from Zhongliangshan Southern Coal Mine, Chongqing, were investigated by means of small angle X-ray scattering(SAXS) combined with low temperature nitrogen adsorption. The results from SAXS indicate that the scattering intensity and micropore volume increases, the most-probable pore diameter decreases, while the surface fractal dimensions increases with the increase in deformation extent. Similar results were obtained from low temperature nitrogen adsorption experiments. However, the surface area measured from SAXS is somehow 1-2 orders of magnitude higher than that from low temperature nitrogen adsorption. This is possibly due to the different testing principles followed by these two testing methods.

Keywords: small angle X-ray scattering; tectonically deformed coals; pore structure; low temperature nitrogen adsorption; fractal dimension

收稿日期 2013-12-31 修回日期 2014-03-07 网络版发布日期 2014-04-22

DOI:

基金项目:

国家自然科学基金资助项目(41072116); 国家青年自然科学基金资助项目(41102092)

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