

论文

微焦点显微CT在煤岩热解中的应用

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摘要:

详细介绍了μ225 kV微焦点显微CT试验系统的结构及功能, 该试验系统的焦点尺寸<3 μm, 分辨率达到0.5 μm, 密度分辨率达到0.3%, 是目前国内较为先进的显微CT系统, 为岩石的微细观研究提供了先进的试验设备。利用该试验系统详细地研究了煤岩在不同温度下孔隙裂隙结构的演化发展过程, 研究表明: 无烟煤在常温~600 ℃的热解过程中, 孔隙结构参数先增加后减小, 100~200 ℃孔隙结构变化最剧烈, 小孔和大孔都增加, 煤体连通性增加; 500~600 ℃孔隙率、比表面积减小, 连通性下降; 无烟煤在常温~600 ℃的热解过程中, 在200 ℃集中产生了大量裂隙, 裂隙分维数最大, 随温度的升高, 裂隙分维数不断减小, 裂隙以“扩展—搭接—连通”为主。

关键词: CT; 煤岩; 热解; 孔隙; 裂隙

Research on micro focus CT in application of pyrolysis of coal

Abstract:

The paper introduced in detail the structure and function of μ225 kV micro focus CT system with <3 μm focus size and 0.5 μm resolution ratio, and 0.3% density resolution ratio, which is the most advanced CT system in domestic and provided advanced equipment for micro mecro structure research of rock.Using this system, pore and crack structure of coal in different temperature were observed, the research results indicate that, during the pyrolysis of anthracite from room temperature to 600 ℃, the parameters of pore structure increase at the beginning and then decrease, the structure of pore change most acutely from 100 ℃ to 200 ℃, the quantities of the small and big pore all increase, the connectivity of coal goes up; at 500-600 ℃, porosity and specific surface area decrease, connectivity falls; During the pyrolysis of anthracite from room temperature to 600 ℃, a lot of cracks grow up suddenly and the crack fractal dimension is the largest at 200 ℃, during the temperature increasing gradually, the crack fractal dimension decreases gradually and the evolvment of cracks is mainly “extension anastomosis connection” .

Keywords: CT; coal; pyrolysis; pore; crack

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