

论文

构造煤瓦斯解吸初期特征实验研究

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摘要:

利用自制的煤样瓦斯解吸试验装置,在恒温30℃、不同压力、不同粒度条件下,研究平顶山和鹤壁的原生结构煤和构造煤的瓦斯解吸初期速度和解吸量,分析构造煤瓦斯解吸初期的影响因素,建立构造煤瓦斯初期解吸数学模型。实验结果表明:与原生结构煤相比,构造煤瓦斯解吸初期速度更大,其初始解吸速度为1.23~4.20 mL/(g·min),是相同实验条件下原生结构煤的1.36~2.84倍,尤其在前1 min内差别较大;构造煤瓦斯解吸量是一条单调递增的幂函数曲线,0~10 min的瓦斯解吸规律具有分段性,可分为快速解吸段、缓慢解吸段和平稳解吸段,构造煤前10 min瓦斯解吸量可达1 h内解吸总量的60%。分析认为构造煤中大孔和过渡孔的发育程度决定了构造煤瓦斯初期特征;构造煤瓦斯解吸初速度随粒度的减小而增加,但是在极限粒度以下煤粒度对瓦斯初期解吸速度影响较小;瓦斯解吸初速度与吸附平衡压力呈幂指数关系;构造煤瓦斯解吸初期曲线符合文特式。

关键词: 构造煤; 瓦斯解吸; 煤与瓦斯突出; 瓦斯含量

Experimental study on gas desorption of tectonic coal at initial stage

Abstract:

A coal sample test device had been designed for testing the gas desorption velocity and capacities of Pingdingshan and Hebi tectonic coal at initial stage under 30℃, different pressures and granularity conditions. In addition, the study had analyzed the influence factors of tectonic coal gas desorption and established a mathematical model. The results show that the initial desorption velocity of tectonic coal is from 1.23 to 4.20 mL/(g·min), which is 1.36-2.84 times faster than undeformed coal under the same experimental test conditions. In particular, the differences are greater in the first one minute. Tectonic coal gas desorption law is assumed as a monotone increasing power function curve, which can be divided into three stages in the first ten minutes: fast desorption section, slow desorption section and smooth desorption section. The desorption amount of tectonic coal gas in the first 10 minutes occupies 60% of the first one hour. The experimental study results indicate that the initial characteristics of the tectonic coal are determined by the distribution proportion of macroporous and transitional pores. The desorption velocity increases with particle size, which is not obvious when it is below the limit grain size. The desorption velocity and adsorption equilibrium pressure can be described as power-exponential function relationship. The desorption curve of tectonic coal gas at initial stage satisfies the K. Winter expressions.

Keywords: tectonic coal; gas desorption; coal and gas outburst; gas content

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