

论文

两种典型受载含瓦斯煤样渗透特性的对比

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摘要:

利用自主研发的含瓦斯煤岩三轴压缩实验系统,进行了受载含瓦斯煤的渗透特性实验,对比分析了受载含瓦斯型煤与原煤两种典型煤样的渗透特性之间的异同。研究表明,控制煤体渗透率大小的直接原因是有效孔隙度而非总孔隙度,有效孔隙度大,则渗透率大。在恒定瓦斯压力条件下,型煤与原煤的渗透率随围压的增大而减小,均服从负指数函数变化规律;相同实验条件下,型煤渗透率普遍远大于原煤渗透率,且型煤渗透率随围压下降的速度比原煤的快。在恒定围压条件下,型煤与原煤的渗透率呈现先减小后增加的趋势,在瓦斯压力 $p < 1.0$ MPa范围内均具有明显的Klinkenberg效应。全应力-应变条件下,瓦斯渗流规律与煤样的破坏形式相关,煤样渗透率都表现出先减小后增大的现象,并且具有一般的“V”字型变化规律。

关键词: 含瓦斯煤; 型煤; 原煤; 渗透特性; 瓦斯运移

Comparison of permeability between two kinds of loaded coal containing gas samples

Abstract:

Based on the self developed triaxial seepage testing system of loaded coal containing gas, a large number of permeability experiments for loaded coal containing gas under different testing conditions were implemented, then similarities and differences of permeability between briquette and raw coal samples of loaded coal containing weas were analyzed comparatively in detail.The results show that the direct cause controlling coal permeability is not total porosity but effective porosity, and the larger the effective porosity is, the larger permeability becomes.For fixed gas pressure condition, permeability of briquette and raw coal decreases with increasing of confining pressure, and the decreasing rule obeys a negative exponential law.Under the same testing condition, the permeability of briquette samples is generally much larger than that of raw coal samples, and the permeability decreasing speed of briquette samples with confining pressure is faster than that of raw coal samples.For fixed confining pressure condition, the permeability of briquette and raw coal samples shows a trend of first decrease and then increase, and has an apparent Klinkenberg effect in the gas pressure range of $p < 1.0$ MPa.Under the condition of complete stress strain process, gas seepage rule is associated with the failure mode of coal sample in laboratory, and the permeabilities of coal samples all reduce firstly and increase afterward, showing the generally V shaped variation law.

Keywords: coal containing gas; briquette; raw coal; permeability; gas migration

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