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论文

煤岩变形破坏电磁辐射记忆效应实验研究

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摘要: 实验研究了原煤、型煤单轴压缩电磁辐射记忆效应特征、记忆内容及变化规律, 探讨并分析了煤岩电磁辐射记忆效应机理. 结果表明, 煤岩变形破坏电磁辐射具有记忆先期最大应力、纵向应变、横向应变和体应变的能力, 最直接的记忆内容是先期受到的应力、纵向应变和横向应变; 当先期施加的应力水平大于70%~80%时, 电磁辐射记忆能力迅速减弱, 甚至根本失去记忆能力; 煤岩损伤破坏过程的不可逆决定了电磁辐射过程的不可逆, 电磁辐射过程的不可逆是煤岩变形破坏电磁辐射记忆效应的直接原因. 煤岩电磁辐射记忆效应理论在地应力测试、巷道围岩不同应力区范围的确定及煤岩动力灾害预测等方面具有广阔的应用前景.

关键词: 煤岩 电磁辐射 记忆效应 变形破坏

An experimental study of the electromagnetic emission memory effect during the deformation and fracture of coal or rock

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Abstract: The characters, the contents and their regularity of electromagnetic emission

扩展功能

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(EME) memory effect during the deformation and fracture of raw coal and molding coal are studied by the experimental methods of uniaxial compression. Its mechanism is discussed and analyzed. The results show that EME of coal or rock has an ability of memorizing previous maximal stress, longitudinal strain, lateral strain and cubical strain. The direct memory contents of coal or rock EME are the previously received maximal stress, longitudinal and lateral strain. Its memory ability rapidly weakens or is entirely lost when the previous stress level exceeds 70%~80%. The irreversibility of EME process is decided by the irreversibility of coal or rock damage fracture process. The irreversibility of coal or rock EME process is the direct reason why EME during the deformation and fracture of coal or rock has memory effect. The theory of coal or rock EME memory effect has broad application prospects in the measurement of crustal stress, the determination of different stress areas in surrounding rock of tunnel and

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