

论文

煤与瓦斯突出强度能量评价模型

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摘要:

从煤与瓦斯突出过程中能量耗散类型与岩石爆破机理的相似性出发, 利用新表面学说和热力学定律分别计算了突出煤体的破碎功和突出瓦斯的膨胀内能, 建立了煤与瓦斯突出强度能量评价模型。利用该模型对1960—2010年间38起煤与瓦斯突出强度评价分析表明, 一半左右突出的瓦斯膨胀能比破碎功大1~2个数量级, 仅用抛出煤体的质量来评价煤与瓦斯突出的强度是不合理的; 煤与瓦斯突出强度能量评价模型综合考虑了突出过程中煤体的破碎功与瓦斯膨胀能, 将煤与瓦斯突出释放的总能量折合成TNT当量, 依据不同数量级TNT当量标准, 将煤与瓦斯突出强度类型划分为C类突出(小于1 t的TNT当量值), B类突出(1~10 t的TNT当量值)和A类突出(大于10 t的TNT当量值)3类更具合理性。

关键词: 煤与瓦斯突出强度 能量评价模型 破碎功 瓦斯膨胀内能

The energy evaluation model of coal and gas outburst intensity

Abstract:

Considering the similarity of the process energy dissipation of coal and gas outburst and rock blasting mechanism, an energy evaluation model of coal and gas outburst intensity was established. At the same time, the outburst coal crushing power and internal energy of outburst gas expansion were calculated by using new surface theory and the laws of thermodynamics. By analyzing the 38 coal and gas outburst intensity during 1960—2010, the results show that gas expansion energy is more than the broken power 1-2 orders of magnitude in half of outburst amount, so only using the quality of coal thrown to evaluate coal and gas outburst intensity is unreasonable, and The energy intensity of coal and gas outburst evaluation model considered the prominent during the crushing of coal power and gas expansion energy is more reasonable. The coal and gas outburst is converted into the total energy released by TNT equivalent, according to different standards of TNT equivalent magnitude, the intensity of the type of coal and gas outburst is divided into type C (less than 1 t of TNT equivalent values), type B (1-10 t of TNT equivalent value) and type A (more than 10 t of TNT equivalent value).

Keywords: coal and gas outburst intensity; energy evaluation model; broken power; gas expansion internal energy

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