

论文

采空区自然发火的能量迁移理论

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摘要:

根据能量守恒原理提出采空区自然发火的能量迁移理论, 建立采空区能量平衡方程, 推导出采空区最高温度预判方程以及工作面最小安全推进速度计算方程。结合某煤矿31005工作面现场情况, 分析推进速度、工作面风量以及注氮等因素对采空区最高温度和工作面最小安全推进速度的影响。结果表明, 加快推进速度、减小工作面风量以及增大注氮量都能有效降低采空区自然发火危险, 但随着推进速度的增大, 注氮所起的防火作用减弱; 减小风量或增大注氮量都会使最小安全推进速度减小, 从而有利于采空区防火。

关键词: 采空区; 自然发火; 推进速度; 风量; 注氮

Energy migration theory of spontaneous combustion in goaf

Abstract:

Energy migration theory of spontaneous combustion in goaf was advanced basis for energy conservation principle, then the energy balance equation of goaf was established to obtain the highest temperature equation of goaf and the equation of the minimum safe speed of coal workface. Combined with the field condition, the influence factors of the highest temperature and the minimum safe speed were analyzed, such as advancing speed of workface, air supply amount and nitrogen injection. The results show that accelerating speed, reducing air supply amount and increasing nitrogen injection quantity all can effectively reduce the spontaneous combustion dangerous in goaf, but the fire prevention effect of nitrogen injection will decrease with the increase of the advancing speed. In addition, the minimum safe speed becomes smaller for the air volume reduced or nitrogen injection quantity increased, which is better for preventing the spontaneous combustion in goaf. The achievement of this research is of theoretical and practical significance for pre judgment of the highest temperature of goaf and formulation of the reasonable fire prevention measures in goaf.

Keywords: goaf; spontaneous combustion; advancing speed; air volume; nitrogen injection

收稿日期 2012-06-21 修回日期 2012-08-23 网络版发布日期 2013-07-01

DOI:

基金项目:

国家自然科学基金资助项目(51174211)

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