

论文

高突低渗煤层立体网状穿层压裂防突技术试验研究

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摘要:

为了解决单一低渗高突煤层瓦斯治理难题, 运用弹性力学和断裂力学的理论, 提出立体网状穿层压裂增透消突技术, 建立计算目标煤层起裂压力的模型。集成配套了井下压裂成套设备, 首次利用SF6 气体示踪剂确定立体网状穿层压裂范围。结果表明: 技术实施后, 缝隙网络发育、瓦斯抽采效果提高了1.69~1.83倍, 煤层膨胀率达到0.581%, 电磁辐射预测突出指标降低了35%~45%, 增透消突效果显著。大范围、区域化实施立体网状穿层压裂技术, 能够实现技术优越性。

关键词: 瓦斯; 起裂压力; 穿层压裂; 电磁辐射; 膨胀率

Experimental study of space mesh hydraulic fracturing by drilling through strata for outburst prevention in severe-outburst and low-permeability coal seam

Abstract:

In order to research the problem of gas in severe-outburst and low-permeability single coal seam, by applying the fracture mechanics and elastic theory, a technology about space mesh hydraulic fracturing by drilling through strata for outburst prevention in severe-outburst and low-permeability single coal seam was presented. A model was established to deduce the value of initiation pressure, and a new device exporting flowrates and pressure was produced. The industrial experiments were implemented with SF6 tracer investigating the fracture network. The results show that the technology can largely increase the permeability of the seam, improve the comprehensive gas drainage rate by 1.69-1.83 times, expand the coal seam 0.581%, and reduce the electromagnetic radiation prediction index 35%-45%. Compared with the small areas, this method can eliminate the outburst by increasing permeability with hydraulic fracturing in large areas.

Keywords: gas; initiation pressure; hydraulic fracturing by drilling through strata; electromagnetic radiation; expansion ratio

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