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论文

薄煤层超高水材料充填开采相似模拟试验研究

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摘要:

以山东某矿煤岩赋存条件为原型, 取线性比 $Cl=1/150$ 、时间比 $Ct=1/150$ 、强度比 $CR=143 \times 10^{-3}$ 进行了薄煤层(厚度1.2 m)超高水材料充填开采相似模拟试验研究。设计了试验参数及超高水材料在模型采空区的充填方法, 揭示了薄煤层超水材料充填开采采场覆岩及地表活动规律, 并与类似条件下的垮落法开采进行了对比。结果表明: 与垮落法开采相比, 超高水材料充填开采时工作面超前支承压力的影响范围缩小且峰值明显降低, 工作面后方上覆岩层稳定时间缩短, 没有出现垮落带与明显断裂带; 该技术能将地表移动和变形控制在要求规定的范围内, 提高充填率有助于降低覆岩活动与地表变形程度。

关键词: 超高水材料; 充填开采; 相似模拟试验; 薄煤层; 覆岩; 地表

Research on superhigh-water material filling mining in thin coal seam through similar simulation experiment

Abstract:

Using the coal rock occurrence conditions of a coal mine in Shandong Province as the prototype, linear ratio $Cl=1/150$, time ratio $Ct=1/150$ and strength ratio $CR=1.43 \times 10^{-3}$, similar simulation test was conducted to research on superhigh-water material backfill mining in thin coal seam(1.2 m thick). Test parameters and the model's gob filling methods for superhigh-water material was designed, activity rules of overburden strata and surface in conditions of superhigh-water material filling mining in thin coal seam was revealed and was compared with the traditional caving mining under similar conditions. The results show that compared with caving mining, when superhigh-water material backfill mining technology is used, scope of influence and peak value of lead abutment pressure reduce, stable time of overburden strata for mined-out area shorten, and no caving zone and obvious fissure zone appear. This technology can control the surface movement and deformation in the required range, and the degree of overburden strata's activity and surface deformation could be reduced if filling ratio is improved.

Keywords: superhigh-water material; filling mining; similar simulation experiment; thin coal seam; overburden strata; surface

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