

## 岩石的风化损伤属性与缩小防护煤柱开采机制研究

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**摘要** 以大量试验数据、现场测试资料和大规模缩小防护煤柱开采工程实践为依据, 研究隐伏煤田基岩风化带的分布特点。结果表明: 岩石风化损伤后具有强度降低, 塑变能力增强; 多趋泥化, 裂隙易于弥合, 再生隔水能力显著增强, 亲水能力强等变异特征以及工程地质特性。重点论述风化带内煤层开采具有移动快、变形大、回缩快和下沉大等覆岩破坏移动演化新特征, 获得以泥质岩类为主的风化带岩层受开采扰动的影 响, 具有阻隔底含水下渗和抑制导水裂隙带继续发展的双重作用和煤岩柱厚度与风化程度是影响导水裂隙带发育高度的主导因素等新的认识。同时, 阐述了缩小防护煤柱开采的机制, 系统地提出了采空区滞后控水、煤水分流、加大开采高度、物探预测和地质弱面预先加固等一系列确保安全的关 键技术保障措施。对类似矿井浅部资源的回收与安全开采具有理论意义和应用价值。

**关键词** [岩石力学](#); [风化损伤](#); [覆岩破坏](#); [演化特征](#); [资源回收](#)

分类号

## STUDY ON THE WEATHERED DAMAGE ATTRIBUTES OF ROCK AND THE LAW OF REDUCTION FOR COAL COLUMN PROTECTION

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### Abstract

Based on a large number of experimental data, in-situ observations and mining engineering practice on a large-scale reduction for coal column protection in weathered zone, the distributed characteristics of the weathered zone of bedrock in covered coal field are studied. The weathered rocks have a series of variational characteristics such as the decreased intension, increased plasticity deformation, muddy tendency, easily combined fractures, greatly boosted water resistance, and strong hydrophilicity and so on. The characteristics of engineering geology, which mainly cover the new movement evolution characteristics of overburden damage mining in weathered zone such as fast movement, large deformation, quick contraction and compression, and great subsidence, are studied with some new understandings, such as the rocks in weathered zone mainly composed of argillaceous rocks that have the dual functions of water blockage and water flowing prevention in fractured zone from development with mining influence. The thickness and the weathered degree of coal column are the main factors affecting the height development of flowing fractured zone and so on. The mining mechanism of

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reduction for the coal column protection is studied. A series of new measures of key techniques are proposed to guarantee extraction safe for the first time such as lagged controlling water in exhausted workings, distribution of coal and water, the height increase of extraction, geophysical prediction, and pre-reinforcement of geological fractures and so on. It has important theoretical application for the reclamation and safe mining in shallow resources of similar coal mines.

**Key words** [rock mechanics](#); [weathered damage](#); [overburden damage](#); [evaluation character](#); [resources recycle](#)

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