

# 煤与瓦斯突出危险性的模式识别和概率预测

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收稿日期 2005-6-24 修回日期 2005-8-5 网络版发布日期 2007-3-23 接受日期 2005-6-24

摘要 煤与瓦斯突出危险性的多因素模式识别概率预测研究涉及到采矿工程、安全工程、地质工程、地理信息系统(GIS)、概率论、信息科学和人工智能(AI)。在理论分析和查明多个突出影响因素与突出危险性之间的内在联系的基础上, 确定模式识别准则、建立识别模型, 完成模式识别系统设计、模式识别算法研究、概率预测准则确定和煤与瓦斯突出预测危险性预测系统的开发。以活动构造、最大主应力、瓦斯压力和瓦斯含量等8个因素作为煤与瓦斯突出发生的主要判据, 用模式识别方法实现了煤层突出危险性的分单元概率预测, 可方便地划分煤与瓦斯突出的危险区、威胁区和安全区, 对煤与瓦斯突出危险性做出评估和预测, 提高瓦斯灾害预测的准确性。建立了一个比较科学的煤与瓦斯突出区域预测方法, 使煤矿安全工作者准确判断和预防煤与瓦斯突出成为可能。

关键词 [采矿工程; 煤与瓦斯突出; 模式识别; 概率预测; 地质动力区划](#)

分类号

## PATTERN RECOGNITION AND POSSIBILITY PREDICTION OF COAL AND GAS OUTBURST

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### Abstract

The study of coal and gas outburst with multi-factor pattern recognition method is related to coal mining, safety engineering, geology engineering, geographic information system(GIS), probability theory, information science, and artificial intelligence (AI). Based on theoretical analysis and the relation among the factors that affect coal and gas outburst, the norm and model of pattern recognition are established. Then the design and algorithm of pattern recognition system are completed, on which the probability prediction norms are certain and the development of coal and gas outburst prediction system is completed. With eight factors including active fault, maximal stress, gas pressure, and gas content acting as the main discriminant, the pattern recognition method was used to perform possibility prediction of coal outburst; and the mining area was then divided into coal and gas outburst dangerous area, threaten area and safe area, respectively, to assess and predict the danger of coal and gas outburst. Thus the accuracy of coal and gas outburst prediction is improved. By the method, a comparatively scientific region prediction of coal and gas outburst are built; and it is possible to judge and precontrol the coal and gas outburst.

**Key words** [mining engineering; coal and gas outburst; pattern recognition; possibility prediction; geo-dynamic zoning](#)

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