



# 岩矿测试

## ROCK AND MINERAL ANALYSIS

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文章摘要

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矿产品中污染物溶解释放研究进展

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## Recent Research and Development on Dissolution and Release of Contaminants in Mineral Products

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中文摘要:

我国原矿、精矿消费量和尾矿产出量巨大, 这些矿产品中有毒有害污染物的溶解释放(称为“溶出”)已经成为一个普遍存在的环境问题。本文阐述了目前国内外矿产品污染物溶出的研究现状, 总结了研究矿产品中污染物溶出最常用的四种模拟试验方法(湿度室试验、淋滤柱试验、静态浸泡试验、萃取试验)的应用进展。湿度室试验可模拟自然风化过程, 确定污染物溶出速率和产物; 淋滤柱试验可模拟降水和喷淋过程, 提供污染物吸附和解吸附动力学依据; 静态浸泡试验可模拟被水浸泡过程, 探明溶出规律和产物; 萃取试验可对污染物进行形态分析, 评估介质中污染物的流动性、稳定性等。污染物溶出的各种影响因素由强到弱依次是pH值、淋溶浸泡时间、温度、固液比、矿石粒径, 多数情况下pH值越大、浸泡时间越长、温度越高、固液比越小、粒径越小越有利于污染物的溶出。溶出是一个长期和具有潜伏性的过程, 其内部发生一系列物理化学反应, 显示出与扩散效应不同的规律。目前这方面的研究对象还主要集中于废弃的尾矿, 对经运输、堆放并在人类生活区使用的原矿、精矿产品的污染物溶出有待进一步研究, 需要对其溶出污染进行预测和评估, 采取有效措施控制和治理矿产品的污染。

英文摘要:

The consumption of raw ore and ore concentrate and the product of tailings are currently very high in China. The hazardous and toxic contaminants released from mineral products have become a general environmental problem. In this paper the components of contaminants in mineral products and recent research involving them is briefly introduced. The four different leaching simulation experiments of humidity cell, column, static immersion and extraction are discussed in this paper. The humidity cell experiment can simulate natural weathering reactions of products and determine the dissolution rates of contaminants and related products. The column experiment can simulate hydrometeor or drench conditions to provide the kinetic basis for both adsorption and desorption. The static immersion experiment can simulate immersion processing in water, in order to study the release law and related products. The extraction experiment can be used to conduct chemical morphological analysis for contaminants to evaluate the mobility and stability of contaminants in a medium. Various impact factors for contamination dissolution are summarized. Influencing factors in order of strong to weak were pH, leaching or soaking time, temperature, and solid-liquid ratio and ore particle size. In most cases, the higher the pH, the longer leaching or soaking time, the higher the temperature, the smaller solid-to-liquid ratio and the smaller the mineral products particle size, the easier to leach contaminants. Leaching of contaminants was found to be a long-term and latent process. There was a series of physical and chemical reactions that took place inside the products, which indicated the different leaching rules with the diffusion effect. At present, the object of this study is mainly focused on tailings, however, the leached contaminants from the stacked raw ore and ore concentrate products for human use need further research. Leached contaminants need to be predicted and assessed in order to take effective measures to control or manage pollution from mineral ores.

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