煤炭学报 2013, 38(10) 1819-1824 DOI: ISSN: 0253-9993 CN: 11-2190

论文

密闭救援空间内碱石灰去除二氧化碳效率影响因素分析

栗婧，金龙哲，汪声，徐洋

北京科技大学 金属矿山高效开采与安全教育部重点实验室，北京 100083

摘要：

在矿用救生舱、载人航天器等有人应急生存或作业的有限空间内长时间生存，去除人体代谢产生的二氧化碳是保障人员生存的重要措施。碱石灰相比于其他吸附药剂具有吸附稳定性高、技术成熟、价格合理等特点，作为密闭救援空间空气净化的吸附药剂具有无可替代的优点。但是救生舱等密闭救援空间由于受到灾变后特殊条件（外部动力中断及体积等因素）限定，要求碱石灰具有较高的吸附率和吸附速率。通过对市场粒径、组分、产品吸附率等条件的筛选，共选出6种碱石灰进行了不同组分、不同厚度、不同风速、不同温度及湿度下的吸附率影响因素试验，得到了碱石灰对二氧化碳吸附的最佳配比及在密闭救援空间内工作的最佳方式和最佳使用条件。结果表明：碱石灰在救生舱等密闭救援空间内使用条件、优化其成分配比、开发相关环境控制与生命保障技术装备提供了必要的数据支持及理论参考。

关键词： 密闭救援空间；救生舱；碱石灰；空气净化

Analysis of efficiency influencing factor of using soda lime absorbing the carbon dioxide in confined space

Abstract:

It is important to remove the carbon dioxide produced by human metabolism in the limited confined space of some emergeny or work during a long time rescue，such as refuge chamber or manned spacecraft.Compared with other absorbent，the sodium lime has more stable performance，more mature technology and more reasonable price，which is the irreplaceable advantage as an absorbent used for air purification in the confined space.Due to the special conditions (such as interruption of power outside，volume restrictions and so on) after coal main disaster，the sodium lime is required to have higher adsorption efficiency and rate.In this paper，six kinds of sodium lime products were selected according to particle size，composition，adsorption efficiency and other conditions.According to the test that the sodium lime absorbing carbon dioxide under different composition，thickness，wind speed，temperature and humidity，the best recipe，the best work mode and best use conditons of soda lime were determined.The conclusion of this study provides the necessary data support and theoretical guidance to determine potassium superoxide medicine plate in confined spaces such as refuge chamber using conditions，optimizing the allocation，developing environment control and life support technology and equipment.

Keywords: confined space；refuge chamber；soda lime；air purification

收稿日期 2013-05-02 修回日期 2013-09-02 网络版发布日期 2013-11-12

DOI:

基金项目:

国家“十二五”科技支撑计划资助项目（2011BAK09B04）

: