

深部盐矿油气储库水溶造腔控制的几个关键问题

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SEVERAL KEY PROBLEMS ABOUT CONTROL OF SOLUTION MINING FOR OIL/GAS STORAGE IN DEEP SALT MINE

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摘要

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摘要 我国正在大规模规划和建设深部盐矿油气储库, 如何实现安全、高效水溶造腔已成为亟待解决的技术难题。综合造腔工程实践和理论研究成果, 解决该技术难题需要重点关注5个关键问题: 我国盐矿夹层的典型分布特征, 造腔环境下夹层溶蚀及力学特性弱化, 夹层垮塌机制、模式和判别, 管柱动力破坏机制与影响因素, 造腔控制技术与现场应用。对与上述问题相关的主要研究进展进行系统综述和分析, 认为近年来在典型夹层垮塌机制及造腔控制方面已取得一些重要的理论和技术突破, 解决或者解释了一些工程问题, 对我国盐穴储库建设提供了一定技术支撑, 但在不同类型夹层溶蚀特性、多因素下管柱动力失稳模型以及造腔设计室内模拟等方面还远不够深入和全面。最后对近期迫切需要进一步开展的研究工作进行展望。

关键词: 岩石力学 盐岩 油气储库 水溶造腔 控制技术 关键问题

Abstract: The projects of oil/gas storage in deep salt mine are being massively planned and constructed in China. It has been a technical problem to be solved urgently that how to realize safe and efficient leaching of storage cavern. Combining engineering practices and theoretical results, five key problems should be paid close attention to, i. e. typical distribution characteristics of salt mine in China; corrosion and mechanical property weakening of interbed in leaching environment; mechanism, failure mode and discrimination of interbed collapse; dynamic characteristics of tubing string and their influential factors; control technology of solution mining and its field application. By summarizing the main progresses in above problems, it is found that some major breakthroughs in mechanism of interbed collapse and control technology of solution mining have been made. Based on the breakthroughs, some engineering problems have been solved or explained. The results provide technological support for salt cavern storage. However, the researches are far from in-depth and comprehensive on corrosion property of different interbeds, dynamic instability model of leaching tubing under various factors, and laboratory simulation of cavern leaching design. Finally, several works that should be carried out further are listed.

Keywords: rock mechanics salt rock oil/gas storage solution mining control technology key problems

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