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钼矿石与钼精矿成分分析标准物质研制

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Preparation of Molybdenum Ore and Molybdenum Concentrate Reference Materials

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作者	单位
刘妹	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000
程志中	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000
顾铁新	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000
黄宏库	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000
鄢卫东	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000
杨榕	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000
潘含江	中国地质科学院地球物理地球化学勘查研究所，河北 廊坊 065000

中文摘要：

钼矿勘查开发与综合利用评价等工作需对其化学成分进行准确测试,标准物质可为分析测试提供基础标准和技术支撑。我国已有的钼矿石和钼精矿标准物质系列性不足,且余量不多,多数样品已耗尽。本文为满足钼矿资源勘查、开发与贸易的总体需求,研制了3个钼矿石和1个钼精矿成分分析标准物质。根据设计的钼含量的梯度范围和钼矿的矿床成因,在钼矿资源储量最多的河南省采集了1个钼尾矿(Mo含量0.02%)、1个钼矿石(Mo含量0.09%)和1个钼精矿(Mo含量50.0%)。3个钼矿石采用重量法组合制备的方式加工,1个钼精矿为原样粉碎加工,钼精矿在加工制备过程向球磨机内充氩气保护,防止硫化物氧化。按照一级标准物质研制规范,采用13家实验室使用多种准确可靠的方法共同定值,定值元素包括成矿元素(Mo),可综合利用元素(W、S、Cu、Pb、Zn、Fe、Bi),具找矿和矿产评价意义的微量元素(Ag、As、Cd、Mn、P、Pb、Sb)及构成脉石的主成分(SiO_2、Al_2O_3、Fe_2O_3、CaO、MgO、Na_2O、K_2O)共计26种。3个钼矿石标准物质Mo的含量分别为0.066%、0.15%、0.54%,1个钼精矿标准物质Mo的含量为50.08%,是已有标准物质的良好补充和完善。标准物质经均匀性和稳定性统计检验具有良好的均匀性和稳定性;标准值计算方法正确,不确定度评定合理,经国家质量监督检验检疫总局批准为国家一级标准物质(编号为GBW 07141~GBW 07144),可用于钼矿的勘查、开发、选冶及贸易中化学成分测试的量值标准与分析质量监控。

英文摘要：

Accurate analysis of chemical compositions is vital for exploration and comprehensive utilization of molybdenum minerals. Reference materials can provide criterion and technical support for the chemical composition analysis. At present, there are insufficient reference materials of molybdenum ore and concentrate in series. Most molybdenum ore and concentrate national materials are depleted in China. In order to meet the demand of molybdenum resources exploration, development and trade, three molybdenum ore and 1 molybdenum concentrate reference materials have been prepared, in which the contents of Mo are 0.066%, 0.15%, 0.54% and 50.08%, respectively. Original samples of these reference materials were collected from Henan province which has the largest reserves of molybdenum resource in China. Samples of molybdenum tailing (Mo: 0.02%), molybdenum ore (Mo: 0.09%) and molybdenum concentrate (Mo: 50.0%) were collected. Three molybdenum reference materials were prepared through a weight combination method with corresponding original samples. The molybdenum concentrate reference material was prepared by directly crushing the original sample of molybdenum concentrate. In order to prevent sulfides in molybdenum concentrate from oxidizing, a ball mill was filled with argon during the grinding procedure of the sample. According to the national standard reference materials criterion, a variety of methods at 13 laboratories were applied to determine the chemical compositions. 26 indices including metallogenetic elements (Mo), elements for comprehensive utilization (W, S, Cu, Pb, Zn, Fe, Bi), trace elements for mineral exploration (Ag, As, Cd, Mn, P, Pb, Sb), and principle components in gangue (SiO_2, Al_2O_3, Fe_2O_3, CaO, MgO, Na_2O, K_2O) were determined. These reference materials show good homogeneity, stability, standard value and reasonable uncertainty after corresponding statistical tests. They are a good supplement to improve existing reference materials and have already been certified and approved as national primary Certified Reference Materials (CRMs) by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (serial numbers: GBW 07141-GBW 07144), which can be used to give criterion and quality monitoring to analysis in the process of molybdenum minerals exploration, development, beneficiation, metallurgy and trade.

主管单位：中国科学技术协会
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国家地质实验测试中心

通讯地址:北京市西城区百万庄大街26号
E-mail：ykcs_zazhi@163.com；ykcs_zazhi@sina.com
京ICP备05032737号-2
技术支持：北京勤云科技发展有限公司

邮 编：100037
电 话：010-68999562 68999563
传 真：010-68999563