

研究报告

应用同位素稀释质谱法原理准确测量锂同位素丰度

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摘要 研究了基于同位素稀释质谱法原理准确测定锂同位素丰度的方法, 编制方法的求解方程。对样品和稀释剂进行了纯化, 用ICP发射光谱测定了其杂质元素总量, 配制样品和稀释剂溶液。用质量法配制样品和稀释剂的混合溶液, 用热电离质谱法测量了同位素丰度比值。计算得到方法的系统偏差校正因子为0.992 0。通过测量IRMM 016锂同位素标准物质得到的校正因子与本方法的校正因子一致, 验证了方法的可靠性。用校正因子校正样品和稀释剂的同位素丰度比的测量值, 得到准确值。同时, 评定了方法的不确定度。结果显示, 在95%的置信水平下, 应用这种方法测定锂样品同位素丰度比值, 其相对扩展不确定度为0.26%。

关键词 [同位素稀释质谱法; 锂同位素; 系统偏差校正](#)

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Accurate Measurement of Lithium Isotope Abundances by Isotopic Dilution Mass Spectrometry Principle

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Abstract A method for determination of isotopic abundances of lithium based on the principle of isotopic dilution mass spectrometry was studied. Both the sample and the spike were purified. Impurities in the sample were analyzed by ICP-AES. The abundance ratios of $^6\text{Li}/^7\text{Li}$ were measured by thermal ionization mass spectrometry. The correction factor for systematic deviation is iteratively calculated to be 0.992 0 and is in good agreement with that obtained with lithium isotope reference material IRMM 016. The isotopic ratio of the sample is finally obtained by correction of the IDMS measured value with the correction factor. At 95% confidence level the relative expanded uncertainty of the present method for determination of lithium isotopic abundance ratio is estimated to be 0.26%.

Key words [isotopic dilution mass spectrometry\(IDMS\); lithium isotope; calibration of system deviation](#)

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