

研究简报

γ能谱法测定高浓铀样品年龄

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摘要 建立了用γ能谱法测定铀年龄的方法, 用低本底高分辨γ谱仪通过测定²¹⁴Bi/²³⁴U活度比得到高浓铀样品的年龄。由于采用了内部效率自刻度, 因此, 该方法不受样品物理形态和几何形状的限制, 也不需要标准样品对系统进行效率刻度。对硝酸铀酰样品的铀年龄测量结果为18.00 (4.1%) 年, 与样品实际年龄的相对偏差为-4.8%, 误差主要来源于²³⁴U/²³⁵U比值的测量误差。

关键词 [铀年龄; 低本底γ谱仪](#)

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Age-Dating of Highly Enriched Uranium by Gamma Spectroscopy

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Abstract The age of uranium samples are measured through the radioactivity ratio of ²¹⁴Bi/²³⁴U by gamma spectrometry. The principle of measurement for radioactivity ratio of ²³⁴U/²³⁵U, ²³⁴U/²³⁵U and ²¹⁴Bi/²³⁸U using intrinsic efficiency calibration is discussed. The measurement is a nondestructive assay method for uranium age-dating by gamma spectrometry which is applicable to materials in any physical form and geometrical shape. Two different physical form and geometrical shape samples are measured and investigated, one is U₃O₈ powder, the other is uranyl nitrate. The measurement results are 27.25 and 18.00 a respectively. For the uranyl nitrate sample, the relative standard deviation of highly enriched uranium (HEU) age determination is less than 5% between the measured and declared age.

Key words [uranium age;](#) [low background](#) [gamma-spectrometry](#)

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