技术及应用

Pu材料γ能谱分析软件CMGA2.0

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摘要　在92～112 keV区间内，Pu材料的多通道γ能谱共包含^{238}Pu、^{239}Pu、^{240}Pu、^{241}Pu和^{241}Am自发衰变发出的8条γ射线和29条X射线。CMGA通过分析该区间能谱，可给出样品中Pu同位素丰度。升级后的CMGA（2.0版）对2例样品6次重复测量的能谱进行分析，其给出的^{240}Pu与^{239}Pu含量的比值分别为质谱分析结果的1.010 ± 0.008和0.995 ± 0.011。通过对比CMGA2.0使用不同本底描述方法得到的92～105 keV区间能谱拟合图，可看出双线性积分步本底函数可更好地描述复杂重峰下的本底。

关键词　Pu同位素丰度　多通道γ能谱　非破坏分析　本底
分类号

CMGA2.0—A Code to Assay Abundances of Plutonium Isotopes With **g** -ray Spectrum

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Abstract A plutonium multi-channel γ-ray spectrum at 92 to 112 keV contains 8 γ-ray lines and 29 X-ray lines which are decayed from ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu and ^{241}Am. CMGA can provide isotopes abundances of a sample by analyzing its spectrum in this region. After unfolding γ-ray spectra of two samples (each sample has been measured 6 times), the value of ^{240}Pu/^{239}Pu given by CMGA2.0 normalized to that measured with mass spectrum method is 1.010 ± 0.008 for sample 1 and 0.995 ± 0.011 for sample 2, respectively. Precision of the results was comparatable with that from MGA and FRAM. Comparing the different fitting results from CMGA2.0 with different methods for describing the background shape, it is found that bilinear step background method can accurately describe the background shape in the multi-peak region.

Key words plutonium　isotopes　abundances　multi-channel　γ-ray　spectrum　non-destructive　assay　background

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