

技术及应用

用中子活化分析镀膜厚度及其探测极限研究

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摘要 本工作提出用中子活化分析有基底的单层或多层镀膜厚度的方法。用Am-Be中子源对Au、Al、Cu等薄膜活化后,用HPGe探测器测量被活化薄膜放出的特征 γ 射线全能峰面积,并用蒙特卡罗方法模拟计算HPGe探测器对不同特征 γ 射线的探测效率,得到用反应堆中子源活化分析不同元素镀膜厚度的方法和探测极限。与目前广泛使用的X射线荧光方法相比,其分析灵敏度可提高几个量级。

关键词 镀膜厚度 中子活化 测量灵敏度

分类号

Investigation on Feasibility and Detection Limits for Determination of Coating Film Thickness by Neutron Activation Analysis

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Abstract A method for the determination of coating film thickness by neutron activation was proposed in this paper. After Au, Al and Cu et al. films were activated with a Am-Be neutron source, the characteristic γ -rays emitted by the activated nuclides in the films were counted with a HPGe γ spectrometer. The detection limits of film thickness by ray counts and the Monte-Carlo simulated detection efficiencies. The possible detection limits are typically 4-5 orders of magnitude better than those by fluorescent X-ray method, which is currently widely used to determine coating film thickness.

Key words coating film thickness neutron activation measuring sensitivity

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