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SOME UNCERTAINTIES ASSOCIATED WITH SELF-CALIBRATION
OF MICROPIXE ANALYSIS

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ABSTRACT

The technique of self-calibration, based on internal labelling of target samples with known amounts of a given element, is often used in conventional PIXE analysis of environmental and biological samples, usually when a large number of samples is to be analyzed. However, extreme care should be exercised when attempting to use self-calibration procedures for microPIXE analysis, because the microdistribution of the labelling element in a drop of solution, for example, is usually non-uniform and particle microbeams with a homogeneous profile are difficult to obtain. This paper presents the results of a series of scanning irradiations by a 20 μm proton beam across dried solution drops containing known initial concentrations of thorium which had been deposited onto two different backings. Non-uniform distribution of thorium within the dried drops was observed.

INTRODUCTION

Particle Induced X-ray Emission (PIXE) has been used in many analytical applications for over a decade. However, the calibration procedures for quantitative analysis by either PIXE or microPIXE vary among laboratories, depending on the experimental arrangement available, the objectives of the experiments being carried out, and other factors.

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