



THICKNESS MEASUREMENT BY BETA BACK SCATTERING TECHNIQUE

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Abstract

A technique used for measuring a certain thickness for polyvinyl chloride (PVC) sheets coated on the aluminum substrate by β - Particles reflection. The optimum Value measured with thickness of about 35 μm comparable with those obtained from the optical method. The source of β -ray that was used in this technique Cs – 137.

قياس السمك بواسطة تقنية استتارة جسيمات بيتا

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الخلاصة

تم استخدام تقنية الاستتارة لجسيمات بيتا β -Particles لحساب سمك معين لمادة بولي فاينال كلوريد (PVC). القيمة المحددة لقياس هذا السمك بحدود 35 مايكرون مقارنة لمثيلاتها المقاسة بالطريقة الضوئية، المصدر لجسيمات بيتا هو سيزيوم 137 (Cs-137).

Introduction

The thickness of coated material as thin film can be determined by using a radioactive source in various ways such as X-ray fluorescence (XRF), Activation Analysis and Scattering, etc. [1]. The measured thickness depends on the source activity, the properties of materials that used in preparation of a certain thin film.

Geiger-Muller Counter is used to detect beta backscattered ray and the last is function for the thickness of the coated layer on a certain substrate. This technique is used to measure almost any thin coating material as long as there is a significant difference in atomic numbers [2] of the coating and substrate. The effective range of the film thickness that can determined by this method was about 1-100 (MM). There are a combination sources used to beta back scattering, in addition to the sources Cs-137, represented by Sr-90/Y-90 and Ru-106/Rh -106.

Experimental work

The detection of beta back scattering measured by a setup of simple experiment contains a source and G-M counter is located on the same side of samples having low atomic number (z). The intensity of scattered radiation by a sample under study is function to the sample thickness or mean atomic number. That mean it is used for multipurpose application, in the case of sample thickness is known. This technique is used for determination the atomic number of any certain material coated as thin film so it is called Z-gauging [1].