9th International Conference on NDT of Art, Jerusalem Israel, 25-30 May 2008
For more papers of this publication click: www.ndt.net/search/docs.php3?MainSource=65

ABSOLUTE MEASUREMENT OF THE COATING THICKNESS WITH THE USE OF ED XRF SPECTROMETER

A.S.Serebryakov, V.I.Koudryashov, V.Yu.Toropov, I.I.Malykh, A.P.Moroz
JSC «Comita»
197 101, St.Petersburg, Roentgen str., 1, Russia
alexs@comita.ru; Tel/Fax: +7 812 346 11 11

ED XRF analyzer X-Art M developed at JSC Comita is used to measure thickness of various coatings on different substrates.

The method of measurement is as follows. The object position is changed step by step in a precise way along the work axis **z** of the analyzer. Each step is of 5 or 10 μ size. Two different elements (1) and (2) are chosen in the coating and substrate, each of which exists in one layer only. Intensities of the signals corresponding to these elements I_1 and I_2 are equal to zero when the object is far from the instrument. After the object is shifted towards the instrument the primary X-ray beam incident at 30^o counting from the object surface first touches the coating and excites element (1). During the further object displacement both I_1 and I_2 are increased and two curves for intensities are obtained versus the object position. These two curves have different slopes, and one can fix the intersection points of the tangents to these curves with the **z**-axis. Absolute thickness of the coating is equal to the difference between these two points.

Several test-objects were made to check the validity of the method suggested: 100 and 200 μ of pure Al layer on the Ti, Cu and Mo substrate. It was shown that the method works with typical error less than 5% when the measurement time for each object position is 60 sec. The other test-objects were made on the basis of pigments and white lead on canvas or cardboard. It was interesting to understand if the method can give separate information on the upper and second layer in the works of fine art.