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## A comparison between destructive and non-destructive techniques in determining coating thickness (Conference Paper) (Open Access)

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## Abstract

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Measuring coating thickness is an important part in research works related to coating applications. In general, techniques for measuring coating thickness may be divided into destructive and non-destructive methods which are commonly used depending on the applications. The objective of this study is to compare two methods measuring the coating thickness of electroplating copper coating on the austenitic stainless-steel substrate. The electroplating was carried out in a solution containing 200 g/L $CuSO_4$, 100 g/L $H_2SO_4$ at room temperature and current of 40mA/cm$^2$ during 20, 40, 60, 80 and 100 mins as coating periods. And the coating thickness was measured by two methods, cross sectional analysis as a destructive technique and weight gain as a non-destructive technique. The results show that at 20 mins coating time interval, the thickness measured by cross sectional method was 16.67 μm and by weight gain method was 17.37 μm, with difference of 0.7 μm and percentage error of 4.11%. This error increased to 5.27% at 100mins time interval, where the values of the thickness measured by cross sectional and weight gain were 86.33 μm and 81.9 μm respectively, and the difference was 4.43 μm. Moreover, though the weight gain method is fast and gives the indication for the termination of a coating process, information regarding the uniformity, porosity and the presence of cracks cannot be obtained. On the other hand, determining the coating thickness using destructive method will damage the sample. © Published under licence by IOP Publishing Ltd.
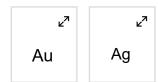
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