

PROPERTIES OF COPPER COATED WITH CARBON NANOTUBES

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Abstract

A thick layer of multi-wall carbon nanotubes (CNTs) was deposited on copper surface by gravity from a solution containing dispersed CNTs in water. Scanning electron microscopy (SEM) was utilized to characterize the morphology, uniformity and thickness of the CNTs coating. A low magnification examination shows a uniform coating. However, a close look at the SEM images reveals that the coating consists of clumps of CNTs deposited rather irregularly on the surface. The Vickers microhardness values measured using a 300 gf load for copper (Cu) and CNT coated Cu samples were 103 and 111 HV respectively. This indicates that the CNT coating yielded a relatively softer surface than Cu. A corrosion test was carried out to investigate the effect of CNTs coating on the corrosion performance of copper. The corrosion resistance (R_p) calculated from the linear polarization resistance results yielded 585 Ohms for Cu and 26,460 Ohms for the CNT coated Cu indicating an increase in the corrosion resistance of about 45 times. In other words, the corrosion rate of Cu has been greatly reduced by the deposited CNT coating allowing a longer lifetime.