Short Communication

Effect of Deposition Potential on Preparation and Corrosion Resistance of SiO₂ Film on Copper

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The silanization of metal surface is a new and environmental anti-corrosion technology. SiO₂ film has been prepared on copper by an electrochemically-assisted deposition technology using tetraethoxysilane as a silane reagent in this research. The effect of deposition potential on structure and performance of SiO₂ film were also studied. The results indicate that SiO₂ is the main component of the deposited films. As the deposition potential changes from -1.0V to -1.5V, the value of SiO₂ content, film deposition rate and film thickness all increase first and then decrease. When the deposition potential is -1.4V, the deposition rate of SiO₂ film is the fastest ($1.13 \times 10^{-5} \text{ g} \cdot \text{cm}^{-2} \cdot \text{s}^{-1}$) and this film is also the thickest (69.1 μm). Moreover, the prepared SiO₂ film has obvious barrier property and can improve the corrosion resistance of the Cu substrate.

Keywords: Electrochemically-assisted deposition, Silane, Sol-gel method, Corrosion resistance

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