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研究报告

超声电沉积铜叠层膜及其耐腐蚀性能研究

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摘要: 采用超声电沉积法制备了一种纯铜叠层膜, 用扫描电镜、X射线衍射分析、腐蚀失重实验以及电化学测试等手段分析了其显微组织与耐腐蚀性能。结果表明: 得到的铜叠层膜每层厚度约为0.3 μm , 微观结构极为致密; 其(200)与(111)晶面取向明显增强, (220)取向则显著减弱。其在20% HNO_3 溶液中开始冒气泡的时间(380 s)比普通电沉积铜薄膜(148 s)延迟了近3倍, 腐蚀速率明显降低; 电化学测试表明, 其自腐蚀电位明显高于普通电沉积铜薄膜, 自腐蚀电流仅为后者的不到1/5, 说明其耐腐蚀性能得到了显著提高。

关键词: 超声电沉积 铜 叠层膜 耐腐蚀性

PREPARATION AND CORROSION RESISTANCE OF COPPER MULTILAYER COATING OBTAINED BY ULTRASONIC-ELECTRODEPOSITION

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Abstract: Copper multilayer coating was obtained by ultrasonic-electrodeposition method. SEM, XRD technology, mass loss measurement and anodic polarization curves were employed to study its metallurgical structure and corrosion resistance performance. The results show that the layer thickness of it is about 0.3 μm , and the microstructure of it is much more compact. The XRD analysis results show that its texture coefficients of (200) and (111) are obviously improved, while the (220) texture coefficient is much weaker. The average bubbling time of it in 20% HNO_3 solution is about 380 s, nearly three times longer than that (148 s) of the ordinary electrodeposited copper coating sample, and the corrosion rate is obviously decreased, Anode polarization curves in 3.5% NaCl solution show that the corrosion potential of it is higher, and the corrosion current of it is less than 1/5 of that of ordinary electrodeposited copper coating, which means the corrosion resistance is greatly improved.

Keywords: ultrasonic-electrodeposition copper multilayer coating corrosion resistance

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