

研究论文

PEG-Cl⁻添加剂存在下的铜电结晶过程研究

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摘要 用线性电位扫描、循环伏安和计时安培电化学方法研究了聚乙二醇(PEG)和Cl⁻同时存在时,酸性镀铜溶液中Cu在玻碳电极(GCE)上的电结晶过程. 研究表明, PEG-Cl⁻作用下Cu的电结晶按瞬时成核和三维生长方式进行. PEG-Cl⁻使电极表面的活性点急剧减少, 并降低了Cu²⁺的扩散系数, 阻化了Cu的电沉积和成核过程. PEG-Cl⁻作用时, Cl⁻离子仍然表现出较强的促进作用, 随Cl⁻浓度的增大, Cu²⁺的扩散系数、Cu的沉积速度和成核速度都有所提高. 适宜的PEG, Cl⁻浓度使成核数密度增大.

关键词 [Cu](#) [PEG-Cl⁻](#) [电沉积](#) [电结晶](#) [玻碳电极](#)

分类号

Electrocrystallization of Copper in the Presence of PEG-Cl⁻ Additive

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Abstract Linear sweep voltammetry, cyclic voltammetry and chronoamperometry techniques were employed to study the copper electrocrystallization process on a glass carbon electrode (GCE) from acid cupric sulfate electrolytes in the presence of polyethylene glycol and Cl⁻ ions. The instantaneous nucleation followed by three-dimensional growth was found for the electrocrystallization from the electrolytes with PEG-Cl⁻. The electrochemical active sites on the GCE surface decrease in the presence of PEG-Cl⁻ in electrolytes, which inhibited the electrodeposition and electrocrystallization of copper sharply. However, Cl⁻ ions had a strong accelerant effect. With the increase of Cl⁻ ion concentration, the diffusion coefficient of Cu²⁺, and the rate of copper electrodeposition and nucleation were promoted. An optimum chloride ion and PEG concentration increased the nuclear density on the GCE surface, which was beneficial to electrodeposits.

Key words [Cu](#) [PEG-Cl⁻](#) [electrodeposition](#) [electrocrystallization](#) [GCE](#)

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