

氯离子对铜在玻碳电极上电结晶的影响

辜敏,杨防祖,黄令,姚士冰,周绍民

汕头大学化学系,汕头(515063);厦门大学化学系,厦门(361005)

收稿日期 修回日期 网络版发布日期 接受日期

摘要 采用线性扫描伏安法和计时安培法研究了硫酸铜溶液中铜在玻碳电极上电结晶的初期行为。在含与不含氯离子的 $0.05\text{mol}\cdot\text{L}^{-1}$ CuSO_4 - $0.5\text{mol}\cdot\text{L}^{-1}$ H_2SO_4 电解液中,循环伏安实验结果表明铜在玻碳基体上的沉积没有经过UPD过程;氯离子明显使Cu的沉积和氧化峰变得尖锐,促进Cu的沉积速度。计时安培实验结果表明,Cu的电结晶按瞬时成核和三维生长方式进行。氯离子不改变Cu的结晶机理,但在 $I\sim t$ 曲线中,导致电流达最大(I_m)所需的时间 t_m 减小、晶核数密度和生长速度增大,从而明显改变Cu沉积层的质量。当 Cl^- 浓度在 $10\sim 20\text{mg}\cdot\text{L}^{-1}$ 范围内,成核的晶核数密度达较大,即氯离子的最适宜添加量。

关键词 [铜](#) [氯离子](#) [玻璃](#) [电结晶](#) [晶核](#) [扫描伏安法](#)

分类号 [0646](#)

Effect of Chloride Ion on Electrocrystallization of Copper on Glass Carbon Electrode

Gu Min,Yang Fangzu,Huang Ling,Yao Shibing,Zhou Shaomin

Department of Chemistry, Shantou University,Shantou(515063)

Abstract The initial stage of copper electrodeposition and the influence of chloride ions on the nucleation and growth of copper on glass carbon from acid sulphate solution were studied by using the cyclic voltammetry and the chronoamperometry method. Instantaneous nucleation with three-dimensional growth is found for the solutions either with or without chloride. Obviously, chloride ions increase the nucleation rate and the nuclear number density of nuclei at the surface. Since the deposits are smooth, bright at high nuclear number densities, it can be concluded that chloride ions effectively promote the smooth and brightness of surface. The higher nuclear number densities are obtained at $10\sim 20\text{mg}\cdot\text{L}^{-1}$ of chloride ions. Maintaining the optimum level chloride ion concentration is beneficial to electrodeposits.

Key words [COPPER](#) [CHLORINE ION](#) [GLASS](#) [ELECTROCRYSTALLIZATION](#) [CRYSTAL NUCLEON](#) [VOLTAMMETRY](#)

DOI:

通讯作者

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(0KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“铜”的 相关文章](#)

▶ 本文作者相关文章

- [辜敏](#)
- [杨防祖](#)
- [黄令](#)
- [姚士冰](#)
- [周绍民](#)