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线路板污泥酸浸液中铜的置换回收

Recovery of copper from circuit board sludge acid leaching solution by replacement and its kinetics

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作者	单位
许玉东	福州大学环境与资源学院,福州 350108
张雅琼	福州大学环境与资源学院,福州 350108
黄启成	福建省环境科学研究院,福州 350003

中文摘要：

采用废铁片作为置换剂,从线路板污泥酸浸液中置换回收铜。结果表明,废铁片置换铜的最佳工艺条件为:铁片用量为30 mg/mL 浸出液,反应时间为6 h,温度为35℃,无需进行pH值调节,直接用原浸出液进行置换反应,此时铜的回收率可达到91.82%,铜的纯度可达到98.96%。对置换出的海绵铜粉进行扫描电镜分析,发现该铜粉的形貌主要是类球形。铁片置换沉淀海绵铜过程符合一级反应动力学方程,活化能为18.30 kJ/mol,该反应属于扩散过程控制。

英文摘要：

The recovery of copper from circuit board sludge acid leaching solution using the iron piece as a replacement agent was investigated. The results demonstrate that the optimum process conditions are as follows: the iron piece amount of 30 mg per milliliter leaching solution, the reaction time of 6 h, the temperature of 35℃, and without need for pH value adjustment of the original leaching solution. Under the optimal reaction conditions, the recovery rate of copper can reach 91.82% and the purity of copper is 98.96%. Scanning electron microscopy was used to characterize the sponge copper powder, showing that a kind of near-spherical shape dominates its morphology. The recovery process of copper by iron replacement corresponds with first-order kinetics equation, the activation energy is 18.30 kJ/mol, and the replacement reaction is mostly controlled by the diffusion process.

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