

電漿熔渣中銅金屬之資源回收

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摘要

本研究主要針對含銅電子廢棄物經電漿熔融處理後熔渣中之銅金屬進行回收純化。本研究所收集之電漿熔渣經磁選、篩分後之篩下物 (-0.149 mm) 約尚含有 32% 之銅，值得進一步回收其銅金屬。本研究結果顯示，此電漿熔渣 (-0.149 mm) 經一次硫酸浸漬，於 18N 硫酸、固液比 10 g/50ml、70°C 下，浸漬 1 小時，可達成 90.56% 之銅浸漬回收率，此一次含銅浸漬液直接在室溫下靜置 48 小時，可將浸漬液中 58.28% 之銅晶析成硫酸銅晶體，而晶析過後濾液中之殘留銅金屬，經以鐵粉為置換劑，可將晶析濾液中之銅 100% 予以置換回收。另殘留於一次硫酸浸漬殘渣中之銅，則可以 18N 硫酸在固液比 5 g/50ml、70°C 下，浸漬 2 小時，可將殘渣中之銅 100% 予以浸漬溶蝕，再以鐵粉置換法，可將二次硫酸浸漬液中之銅 100% 予以置換回收。根據上述方法之實施，應可回收純化電漿熔渣中之有價銅金屬，以達成電漿熔渣之減量及銅資源永續循環使用之雙重目的。

關鍵詞：電漿，熔渣，浸漬，晶析，置換，銅

Recycling of Copper from Molten Plasma Slag

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ABSTRACT

The main purpose of this study was to recover copper from molten plasma slag. After magnetic separation and screening of the collected material, the slag of less than 0.149 mm in size contained 32% copper worthy of further recycling. The results revealed that 90.56% of the copper can be leached from the dross (-0.149 mm) by using 18N H₂SO₄ at a solid/liquid ratio of 10g/50mL at 70°C for one hour; moreover, 58.28% of the copper content in this leachate can be crystallized as CuSO₄·5H₂O after standing for 48 hours at 27°C without any disturbance. After crystallization, the remaining copper can be completely recovered by using iron powder replacement. Subsequently, a