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廢 IC 板電漿熔渣之資源回收

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摘　要

本研究主要針對廢 IC（積體電路）板經電漿熔融後熔渣中之金、銀、銅進行回收研究，本研究方法包括破碎研磨、篩分、磁選、浸漬溶蝕及溶蝕效率分析等。本研究成果顯示，廢 IC 板電漿熔渣之比重爲 3.47、水份爲 0.23%，而灰份爲 101.81%。熔渣經過粉碎、磁選後可得 6.62% 之含鐵物，而不感磁物中含有金 0.0010%、銀 0.0392% 及銅 33.94%。另不感磁物經篩分得知 100 目（0.149mm）以上之熔渣含銅量較高，可直接將其售予煉銅廠作爲冶銅之原料，而 100 目以下，因其粒徑較小且尚含有金、銀、銅有價物，故本研究以鹽酸、硫酸、氨水、硫脲等浸漬劑來進行金、銀、銅之浸漬溶蝕研究。本研究結果顯示以硫脲浸漬效果最好，其最佳浸漬條件爲：硫脲 2.5g，硫酸濃度 7.2N，硫酸鐵 3.3g，固液比 0.03（1.5g/50mL），在室溫下浸漬 2 小時，可得金、銀、銅 100% 之浸漬回收率。

關鍵詞：IC 板，回收，金，銀，銅，浸漬

Recycling of the Plasma Slag in Scrap IC Boards

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ABSTRACT

In this study, various methods for grinding, screening, magnetic separation and leaching are adopted to recover the valuable gold, silver and copper metallic components from the slag of plasma-treated scrap integrated circuit (IC) boards. The results of the compositional analysis reveal that the specific gravity, iron content, moisture and ash content of this slag are 3.47%, 6.62%, 0.23% and 101.08%, respectively. After magnetic separation, the fraction of non-ferrous metal larger than 100 mesh (0.149mm), containing mainly copper, can be sold directly to a copper smelter; moreover, the gold, silver and copper components can be recovered by leaching. The leaching result indicates that a 100% recovery of gold, silver and copper can be achieved by using a thiourea leaching solution.