

Recycling of copper and Aluminium with high purity from end life printed circuit boards

Isabel F F Neto, Cátia A Sousa and Helena M V M Soares
Universidade do Porto, Portugal

The large percentage of Cu present in printed circuit boards (PCBs) residues, usually about ten times more than the Cu amount present in rich-content minerals, makes these residues an attractive secondary source of Cu. The main aim of this work was to develop a simple and nearly-closed two-step process to recover Cu and Al from PCBs residues with high purity. Firstly, a multi-element leaching solution, containing 78 and 85% of the total amount of Cu and Al present in the residue, respectively, together with other metals, was obtained using acidic conditions (HNO₃ 2M for 210' at 50°C). The leached solution was constituted by: 66% of Cu and 28% of Al and smaller amounts of Fe, Sn, Zn, Ni and Ag. In a second step, a bispicolylamine resin (Dowex M4195TM) was used to recover Cu with high selectivity. A flow rate of 0.17mL/min/g of resin was applied to allow maximizing Cu recovery (99.5% of Cu retained). Almost no Al, Fe, Sn and Zn were retained. H₂SO₄ 4 mol/L was used as eluent and 96% of Cu was eluted. The use of DOWEXTM M4195 allowed concentrating the Cu in the final solution (from 18mM of Cu to 31mM of Cu) and enabled purifying Cu into a final Cu solution with high grade of purity (99.0%). Additionally, the amount of Al (85%), leached from the residue and present in the raffinate, was totally recovered as a solid of Al(OH)₃ with 96% of purity.

Biography

Isabel F F Neto has completed her graduation in Biochemistry at the University of Porto and her Master's in Food Technology and Safety at the University Nova de Lisboa. She is at present in the 4th year of PhD studies in Environmental Engineering at Porto University. She has been developing green processes to recovery valuable metals from electronic wastes. She has published 4 papers in reputed journals and presented 3 oral communications.

ineto@fe.up.pt

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