



“Gheorghe Asachi” Technical University of Iasi, Romania



---

## DISSOLUTION OF BASE METALS FROM WASTE PRINTED CIRCUIT BOARDS

Szabolcs Fogarasi<sup>1</sup>, Florica Imre-Lucaci<sup>2</sup>, Árpád Imre-Lucaci<sup>1\*</sup>,  
Attila Egedy<sup>3</sup>, Sorina Astalas<sup>1</sup>, Petru Ilea<sup>1</sup>

<sup>1</sup>“Babeş-Bolyai” University, Faculty of Chemistry and Chemical Engineering, 11 Arany Janos Str.,  
RO-400028 Cluj Napoca, Romania

<sup>2</sup>“Babeş-Bolyai” University, Interdisciplinary Research Institute on Bio-Nano-Sciences, 42 Treboniu Laurian Str.,  
RO-400271 Cluj Napoca, Romania

<sup>3</sup>University of Pannonia, Department of Process Engineering, 10 Egyetem Str., H-8200 Veszprém, Hungary

---

### Abstract

The aim of the present study was to determine the most feasible experimental conditions for the dissolution of base metals (Cu, Ni, Zn, Pb, etc.) from waste printed circuit boards (WPCBs) obtained from WMP. The leaching of WPCB samples was performed with FeCl<sub>3</sub> in HCl solution which allowed the separation of a precious metal rich solid residue and a high base metal concentration solution adequate for base metal recovery. The most favorable conditions for the leaching process were identified on the basis of the defined technical key performance indicators at different HCl (0.1 M-0.3 M) and FeCl<sub>3</sub> (0.2 M-0.4 M) concentrations. The highest performances for the dissolution process were obtained at 0.2 M HCl and 0.3 M FeCl<sub>3</sub>, in a 4 h period, while at a longer leaching period (24 h) at 0.3 M HCl and 0.3 M FeCl.

*Key words:* efficiency factor, leaching, metals, waste printed circuit boards

*Received:* January, 2015; *Revised final:* October, 2015; *Accepted:* November, 2015

---

\* Author to whom all correspondence should be addressed: e-mail: [aimre@chem.ubbcluj.ro](mailto:aimre@chem.ubbcluj.ro)