

**Screening analysis of electronic components in the batch material for
the European project ADIR – Next generation urban mining**

T. Gorewoda¹, J. Anyszkiewicz¹, S. Connemann², J. Charasińska¹, R. Ambrosch³, K. Bergmann²,
S. Britten², H. Brumm⁴, A. Chmielarz¹, M. Eschen⁵, A. Frank³, C. Fricke-Begemann²,
M. Gawliczek¹, C. Gehlen⁶, M. Guolo⁷, A. Hryniszyn¹, M. Knapik¹, S. Kozłowicz¹, J. Kozłowski¹,
W. Kurylak¹, D. Lewandowski¹, J. Makowe⁶, Z. Mzyk¹, R. Noll², M. Potempa¹, G. Sellin⁸, M. Siguier⁹,
A. Tori⁷, F. Veglia¹⁰

¹Institute of Non-Ferrous Metals, Sowińskiego 5, 44-100 Gliwice, Poland; ²Fraunhofer Institute for Laser Technology, Steinbachstr. 15, 52074 Aachen, Germany; ³Pro Automation GmbH, Vienna; ⁴H.C. Starck GmbH, Goslar; ⁵Aurubis AG, Lünen; ⁶Laser Analytical Systems & Automation, Baesweiler; ⁷Osai AS, Torino; ⁸Electrocyling GmbH, Goslar; ⁹SAS I-Cube Research Toulouse; ¹⁰Tre Tau Engineering srl, Torino

e-mail: tadeusz.gorewoda@imn.gliwice.pl
tel: +48 32 23 80 278

ABSTRACT

The European project ADIR – running since 9/2015 – coordinated by the Fraunhofer Institute for Laser Technology fits in with the subject of metals recovery from electronic waste. The goal of the ADIR project is to demonstrate the feasibility of a key technology for next generation urban mining in the scope of inverse production concepts. An automated disassembly of electronic equipment is worked out to separate and recover valuable materials. The concept is based on image processing, robotic handling, pulsed power technology, 3D laser measurement, real-time laser material identification (to detect materials by laser spectroscopy), laser processing (to selectively unsolder these; to cut out parts of a printed circuit board), and automatic separation into different sorting fractions. A data base is built up providing comprehensive information about physical and chemical features of the items to be treated. One of the most important issues was to produce a first set of input data based on laboratory analyses of disassembled mobile phones (MPH). X-ray fluorescence spectrometry was used for screening analysis of components of MPHs and printed circuit boards (PCB). The analyses provided possibilities for determination of valuable components of PCBs from MPHs and server boards, distribution of metals between the components and determination of valuable fractions for the ADIR machine.