

Identification of current processes and technologies used in the recovery of rare earth elements from WEEE

K. LASARIDI¹, C. CHRONI¹, K. ABELIOTIS¹, K. BOIKOU¹, M. VILLARES, A. JANDRIC², J. HOBHOHM³, K. KUCHTA³ AND E. TERZIS¹

¹Department Geography, University of Harokopio, Athens, Attica, 176 76, Greece

²University of Natural Resources and Life Sciences Vienna, Austria

³TUHH -Technische Universität Hamburg, HarburgerSchloßstr. 3621079 Hamburg

*corresponding author: e-mail: klasaridi@hua.gr

Abstract

The increasing production and use of electric and electronic equipment has resulted in the production of a large number of Waste Electrical and Electronic Equipment (WEEE) with significant environmental impact. The volume of WEEE is growing three times faster than the average municipal waste stream in the European Union. According to the European Commission the amount of WEEE produced per EU citizen is about 17-20 kilograms per year and is expected to grow annually between 2.5% and 2.7%.

Concerns over the security of supply of a wide range of strategic or critical raw materials (CRMs) are emerged. Many of the CRMs are speciality metals which are essential to the functioning of electronic equipment, albeit used in small concentrations within a few of the components. These materials include the precious metals, gold, silver and platinum as well as metals such as copper, as well as the Rare Earth Elements (REEs) often known as the Rare Earth Metals (REMs).

A path for the supply improvement of these materials is to recover as much as possible from the Waste Electrical and Electronic Equipment (WEEE) that is currently processed under the WEEE Directives, which were designed primarily to prevent this waste stream going to landfill. On that background, a study into the capacity and technologies for treatment and recovery of strategic raw materials in the EU, the barriers to increasing this capacity and the actions that could be taken to overcome these barriers was deemed as necessary.

In order to understand the current processes and technologies used in the recovery of Critical Raw Materials (CRMs) at treatment and reprocessing facilities in the EU, a European Union wide survey is conducted. This survey is designed to facilitate, the assessment of the currently applied WEEE pre-treatment methods with a clear focus on the fate of critical raw materials (CRM) during processing and the identification of the existing assessment methods of critical materials (CM) recovery rates in order to develop a report outlining the different tools and assessment methodologies that exist today in the EU.

The study is conducted within the framework of the COST ReCrew project, with the aim to enable relevant stakeholders to build on its existing understanding of the EU capacity for the recovery of strategic raw materials, by identifying the technologies for recovery and barriers to increasing recovery within the EU and its immediate markets. The focus is on recovery of CRMs from WEEE products that have reached end of life and are recycled.

Keywords: Rare earths, WEEE, EEE.

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