

Challenges and Innovation in Recycling Processes

June, 2-3 2015

ENSCP- Chimie Paristech, Paris (France)



The development of new technologies and the increasing demand of mineral resources from emerging countries are responsible for significant tensions on the price of non-ferrous metals. Some metals are considered strategic and critical because they are used in many technological applications and their availability remains limited. In addition to carbon-based raw materials like oil or gas, the industry uses about fifty different metallic elements. For many of them, the worldwide annual consumption ranges from a few tens of tons to several hundred thousand tons. Some of them, the so-called strategic metals, are crucial for achieving high performances. They are found in high-tech products such as flat panel TVs (indium), solar panel cells (indium), lithium-ion batteries for electric vehicles (lithium), magnets (rare earths such as neodymium and dysprosium), scintillators (rare earths), aviation, electronic cards (Ag, Au, Pd, Ta, etc.) and medical applications (titanium). Securing the supply of these metals is crucial to continue producing and exporting their technologies and because specific properties of

these metals make them essential and difficult to substitute for a given industrial application. Finally, strategic metal production is critical for numerous industrial sectors since they are often produced and commercialized by a limited number of companies and/or countries. The Waste Electrical and Electronic Equipment (WEEE, or E-Waste) contain huge amount of high valuable and strategic metals (indium, gallium, rare earths, cobalt, copper, gold, silver, etc.) and their concentrations can be greater than those found in classical mining. Therefore, the recovery of these metals from spent materials is of great interest and more and more companies focus their research on the development of efficient and rentable processes.

This symposium aims to bring together academic and industrial protagonists as well as student interested in developing efficient recycling processes of spent materials containing critical and strategic metals.

COMITE D'ORGANISATION

Alexandre CHAGNES (ENSCP-Chimie Paristech)

Franck AGGERI (Mines Paristech)

G rard COTE (ENSCP-chimie Paristech)

Daniel FROELICH (ENSAM Paritech)



INVITED SPEAKERS

Aggeri, A. (Mines Paristech, France)	Circular Economy models when compared with facts
Bourg, S. (CEA, France)	Development of a European network to promote innovation in raw materials extractive metallurgy: PROMETIA
Cote, G. (ENSCP, France)	Chimie ParisTech: a place where science meets the challenges of strategic metals recycling
Dascalescu, L. (Université de Poitiers, France)	Tribo-aero-electrostatic technology for WEEE recycling
Draye, M. (Université de Chambéry)	Strategic metals recycling by extraction and electrodeposition in ionic liquids
Garcia, G. (HIU, Germany)	The role of traction-battery recycling in Li availability
Garcia, G. (HIU, Germany)	Toxicity Assessment of extractants used in LiB recycling
Guezennec, A.G. (BRGM, France)	Bioleaching in WEEE recycling
Lee, J.C. (KIGAM, Korea)	Recycling of e-waste in Korea
Lesage, O. (ENSCP, France)	Selective extraction of strategic metals of WEEE by thermal plasma
Longhurst, P. (P. Longhurst, University of Cranfield, UK)	Feasibility of using Waste Electrical and Electronic Equipment (WEEE) derived plastics for 3D printing
Ménad, N. (BRGM, France)	Recycling of permanent magnet of WEEE
Meux, E. (Université de Lorraine, France)	Recycling of NiCd spent batteries by Electroleaching/Electrodeposition in a single-cell process
Moyer, B. (Oak Ridge National Laboratory, USA)	Supply-Side Technical Challenges in the Recovery and Processing of Critical Materials for Clean Energy
Perrin, D. (Mines d'Ales, France)	Recycling of plastics from WEEE
Pomarede, V. (Gulf Chemical & Metallurgical Corporation, USA)	Recycling of spent oil catalysts: GCMC process for metals recovery
Laucournet, R. (CEA, France)	Recovery and Valorization of used permanent magnets from WEEE
Miguirditchian, M. (CEA, France)	Development of a REE recycling process from used magnet based on solvent extraction
Rollat A. (Solvay, France)	Recycling of rare earths: A Solvay initiative to address the supply challenges
Siret, C. (Saft, France)	Cradle-to-grave LCA of lithium-ion batteries
Shilova, E. (Ajelis SAS)	Innovative approach to selective recovery of strategic metals from industrial solutions with solid sorbents.
Thomas, S. (Veolia)	Circular economy and environmental services in Veolia: an opportunity for value creation and sustainable growth
Tcharkhtchi, A. (ENSAM, France)	X-ray photoelectron detector for sorting plastics from WEEE
Tedjar, F. (Recupyl SAS)	Breakthrough technology for the recovery of valuable metals from molten salts in low temperature range
Thivel, P.X.; Duclos, L. (LEPMI, France)	Platinum recovery from spent fuel cell : evaluation of the global recovery process
Toffolet, R. (Eco-systèmes, France)	Waste Electrical and Electronic Equipment take-back schemes
Van Camp, M. (Umicore, Belgium)	Creating the needed innovation ambition: A Perspective on Recycling from a Global player
Zimmerman, F. (INRS, France)	Chemical risk assessment in WEEE recycling processes

FREE REGISTRATION

Send an email before 19th of May 2015 to **Sophie OMONT** at Sophie.OMONT@ensam.eu to register to this symposium or for information

TECHNICAL PROGRAM

DAY 1

9:00	<i>Welcome</i>
9:30	Short Introduction
9:40	Chimie ParisTech: a place where science meets the challenges of strategic metals recycling (G. Cote, ENSCP, France)
10:00	Supply-Side Technical Challenges in the Recovery and Processing of Critical Materials for Clean Energy (B. Moyer, Oak Ridge National Laboratory, USA)
10:20	Waste Electrical and Electronic Equipment take-back schemes (R. Toffolet, Ecosystem, France)
10:40	Break
11:00	Tribo-aero-electrostatic separation technologies for the recycling of plastics from WEEE (L. Dascalescu, Université de Poitiers, France)
11:20	Thermal stability studies of recycled thermoplastic polymers (A. Tcharkhtchi, ENSAM, France)
11:40	Feasibility of using Waste Electrical and Electronic Equipment (WEEE) derived plastics for 3D printing (P. Longhurst, Cranfield University, UK)
12:00-14:00	Lunch
14:00	Creating the needed innovation ambition: A Perspective on Recycling from a Global player (M. Van Camp, Umicore, Belgium)
14:20	Recycling of rare earths: A Solvay initiative to address the supply challenges (A. Rollat, Solvay)
14:40	Circular economy models when compared to the facts (F. Aggeri, Mines Paristech, France)
15:00	Break
15:20	Chemical risk assessment in WEEE recycling processes (F. Zimmermann, INRS, France)
15:40	Breakthrough technology for the recovery of valuable metals sing molten salts in low temperature range (F. Tedjar, Recupyl SAS, France)
16:00	Platinum recovery from spent fuel cell: evaluation of the global recovery process (P.X. Thievel, University of Grenoble, France)
16:20-16:25	Conclusion (A. Chagnes, ENSCP, France)

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DAY 2

9:00	<i>Welcome</i>
9:30	Recycling of e-waste in Korea, J.C. Lee, KIGAM, Korea)
9:50	Recycling of permanent magnet of WEEE (N. Menad, BRGM, France)
10:10	Recovery and Valorization of used permanent magnets from WEEE (R. Laucournet, CEA, France)
10:30	Development of a REE recycling process from used magnet based on solvent extraction (M. Miguiditchian, CEA, France)
10:50	Break
11:10	Recycling of spent oil catalysts: GCMC process for metals recovery (V. Pomaredet, Eramet Gulf, USA)
11:30	Selective extraction of strategic metals of WEEE by thermal plasma (O. Lesage, ENSCP, France)
11:50	Recycling of Ni-Cd spent batteries by Electroleaching/Electrodeposition in a single-cell process (E. Meux, Université de Lorraine, France)
12:10	Strategic metals recycling by extraction and electrodeposition in ionic liquids (M. Draye, University of Chambéry, France)
12:10-14:00	<i>Lunch</i>
14:00	Circular economy and environmental services in Veolia: an opportunity for value creation and sustainable growth (S. Thomas, Veolia, France)
14:20	<i>Break</i>
14:40	Cradle-to-grave LCA of lithium-ion batteries (C. Siret, Saft, France)
15:00	Toxicity Assessment of extractants used in LiB recycling (R. Garcia Gonzalo, University of Ulm, Germany)
15:20	The role of traction-battery recycling in Li availability (R. Garcia Gonzalo, University of Ulm, Germany)
15:40	Innovative approach to selective recovery of strategic metals from industrial solutions with solid sorbents (E. Shilova , Ajelis SAS, France)
15:40-15:45	Conclusion

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