

8th World Congress and Expo on Recycling

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An innovative approach for e-waste issues solving

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The waste of electrical and electronic equipment represent an important secondary resource of base, precious and rare earths elements but in the same time a serious contaminant for environment. As the disposal is no longer a suitable solution, there have been various technologies of treatment proposed to recover their content and also to eliminate the hazard of this waste. These were generally studied at the laboratory scale and just a few were further implemented at industrial level. The waste printed circuit boards, the e-component of most of all electrical and electronic devices, has been used as study material for base and precious metals recovery by all the transposed technologies from mining industry, i.e. physical-mechanical, pyro-, hydro- and bio-metallurgical procedures. There has been shown that the physical-mechanical procedures do not offer a selective recovery of their content, in particular for the precious metals. Therefore, these were generally used as a pretreatment step to the metallurgical procedures. Between all metallurgical procedures, the hydrometallurgical ones are preferred as they present a high speed of reaction with procedures that are generally easier to control at large scale. In addition, these procedures allow obtaining high grade products that can be further reused for the manufacturing of new electronic products and not limited to. Considering these aspects and also the model of circular economy, the hydrometallurgical approach for both precious and base metals recovery from waste printed circuit boards and its final products and by-products reutilization in the manufacturing of new products (electrical and electronic components and jewelry) by 3D Design Printing technology will be carried out within Fenix European Project which has as core to establish a closed loop within this waste treatment.



Figure 1: Hydrometallurgical process for e-waste treatment

Recent Publications

1. I Birloaga, I DeMichelis, F Ferella, M Buzatu and F Veglió (2013) Study on the influence of various factors in the hydrometallurgical processing of waste printed circuit boards for copper and gold recovery. *Waste Management* 33(4):935-941.
2. I Birloaga, V Coman, B Kopacek and F Veglió (2014) An advanced study on the hydrometallurgical processing of waste computer printed circuit boards to extract their valuable content of metals. *Waste Management* 34(12):2581-2586.
3. I Birloaga and F Veglió (2016) Study of multi-step hydrometallurgical methods to extract the valuable content of gold, silver and copper from waste printed circuit boards. *Journal of Environmental Chemical Engineering* 4(1):20-29.
4. I Birloaga and F Veglió (2016) Study on the influence of various factors in the hydrometallurgical processing of waste electronic materials for gold recovery, Book chapter in "The recovery of gold from secondary resources". ISBN: 978-1-78326-989-1:197-221.

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Biography

F Veglio is currently working as a Full Professor in the Department of Industrial Engineering, Information and Economics University of L'Aquila, Italy. He has experience in the preparation and management of research projects; activity of R&D on the valorization of raw materials and industrial wastes. He has published more than 160 papers on international journals; more than 110 monographic publications; more than 100 communication to congresses, extended abstract e poster; 6 patents (3 national patent; 2 EU patents; 1 WO).

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