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Metal recovery from E-waste by innovative Hydrometallurgical Processes: GOLD-REC and FENIX Projects

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Large amounts of wastes are generated at the end-of-life of electrical and electronic equipment (EEE). Presently, at industrial level, the technologies used for waste of electrical and electronic equipment (WEEE) or E-waste treatment are mostly focused on physical and thermal processes. However, both of them have important drawbacks; the physical procedures are able to achieve only the partial separation of major elements, i.e. copper, iron, aluminum; the thermal treatments require high cost of investments. Till present the hydrometallurgical processes, which are more efficient than physical ones and less costly than thermal procedures, have been only tested at laboratory scale levels. The main core of GOLD-REC and Fenix projects, that are based on the development of hydrometallurgical procedures for the recovery of both precious and base metals from waste printed circuit boards and not limited to, is to extend these procedures at larger scale. Both developed procedures makes the object of two international patent applications that are currently under review. GOLD-REC hydrometallurgical flowsheet consist in application of tow sequential leaching processes on the preliminary physical-mechanical treated WPCBs. The first leaching process make use of a diluted solution of sulfuric acid and hydrogen peroxide in which the dissolution of base metals (mainly copper) is achieved at an efficiency of about 99% and about 40% of Ag. The second one, that is applied on the solid residue of the first leaching process, consist of precious metals (Au and residual Ag) solubilization with thiourea as reagent, ferric sulfate as oxidant and sulfuric acid as pH controlling agent and has an efficiency of over 95%. In FENIX process a new reagents mix is used for leaching step (HCl, acetic acid and H2O2). Cu, Sn, Au and Ag are recovered by sequential cementation steps. This process can be applied also to automotive spent catalysts recovering 99% of Pd and 50% of Pt. Both processes are of high interests and novelty in the field of E-waste and spent catalyst recycling.

Speaker Biography

Vegliò F has completed his Master in Chemical Engineering at the age of 25 years from University of L'Aquila, Italy. He is the Full Professor at University of L'Aquila, Italy. He has over 200 publications that have been cited over 5254 times, and his/ publication H-index is 40 and has been serving as an editorial board member of reputed Journals.

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