National Institute of Technology Rourkela

Defence Seminar

Seminar Title	: RECLAIMING METAL VALUES FROM SECONDARY RESOURCES BY HYDROMETALLURGICAL PATHWAY
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Venue	: Library (Room No. CH-109, Department of Chemical Engineering), https://meet.google.com/dhj-rbdr-xso
Date and Time	: 14 Jul 2025 (05:00 PM)

Abstract : Rapid industrialisation has led to the generation of vast quantities of industrial waste. Improper disposal of these wastes creates a potential threat to the environment and a loss of revenue. By 2050, it is predicted ~50% of India&rsquos population will have their livelihood in urban areas, and waste generation would grow by 5% per year. Recycling of these wastes could be a potential secondary resource to meet the future supply risk of metals, at the same time conserve finite natural resources and reduce environmental problems. In support of this, phosphor from spent fluorescent lamps, mine tailings and waste leach residue from spent magnets have been explored to recover the valuable metals such as REEs, Cu, Ni & Fe, and to synthesize iron phosphate, respectively. Novel hydrometallurgical methods were developed in the current study to recover the valuable metals in their pure form from different secondary resources. In the developed methods, metals from the complex matrix present in the raw material were converted to their soluble phase for ease of separation by roasting and leaching. Metals thereafter from their aqueous phase were selectively separated by solvent extraction using different extractants like HDEHP, Cyanex 272, LIX 84I. Selective and pure metals obtained after stripping the loaded organic were synthesized to value-added products like Tb_4O_7 and $FePO_4$ via precipitation. The chemical compositions of the leach liquors and solid compounds obtained at different stages were analysed by ICP-OES. The characterization study of the solid residue and final product was carried out using XRD, SEM-EDS, and FTIR.

Keywords: secondary resources, phosphor, mine tailing, solvent extraction, iron phosphate