Value Recovery from Mining Wastes

With an increasing demand for metals such as indium, there is pressure on the supply side. To this day, indium is mainly recycled from ITOs and PVs; interest in recycling from mining wastes has grown over the past decade. With this mindset, the goal of this project was to recover indium from wastes well within economic and environmental constraints. A sub-project to this research was the investigation of tungsten recovery from its processing wastes.

One of the goals of the project was identifying and processing a variety of waste streams containing indium, from either mineral processing, pyrometallurgy, or hydrometallurgy. The wastes then underwent a series of beneficiation steps to optimize recovery and grade. In this sense, the research used resources such as Characterization (QEMSCAN, XRD, etc.) laboratory test work with the aim to design and develop preliminary flowsheet.

The scope of the project included:

- **Preconcentration**: After understanding the chemistry and liberation of minerals comprised in each sample, the research investigated the possibility of primary concentration of the waste by utilizing differences in specific gravity, magnetic susceptibility, conductivity, or surface properties of the minerals.
- **Dissolution**: The next phase, with or without potential for preconcentration, was to dissolve the material and put the valued metal in solution.
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- **Purification**: This step involved the increase in the concentration of the metal of interest; it could be via solvent extraction (SX), ion exchange (IX), or precipitation, naming the few possibilities.
- **Final recovery of the metal**: The final phase was to recovery the metal to its highest purity depending on the client’s inquiry. In the case of indium, it was mainly done via precipitation, and refining.

Overview

Research was conducted to economically recover value metals, specifically indium and tungsten, from mining wastes while producing an environmentally benign final waste.

RESEARCHERS

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