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Recovery of valuable elements from secondary sources in the context of a circular economy: Perspectives and challenges using hydrometallurgy

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The industrial revolution has changed society significantly, constantly bringing access to better technologies, propelling economic growth and increased life standards. At the same time, this has come with an ever-increasing exploitation and consumption of natural resources. It is clear that humanity cannot rely on virgin materials alone and that recycling is a must. The recent quest towards sustainability has pushed the concept of a circular economy in front. A first step towards achieving this is the more effective processing and re-use of end-of-life products and other secondary streams, such as mine tailings and production residues. But how easily achievable is this? Are the technologies currently available capable of achieving circularity in a sustainable and economically viable way? At Chalmers University of Technology, Sweden, significant efforts are being carried out to find the most effective processes to recover valuable elements contained in a variety of secondary sources and re-utilize the compounds recovered. This talk will focus on the perspectives of using hydrometallurgy to extract and separate critical and non-critical elements from streams such as mine tailings, batteries, fluorescent lamps, future refrigeration materials, etc. The main challenges associated with this will be presented, together with alternatives, such as direct re-utilization of streams in the manufacturing of novel applications.

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