Pyrometallurgical options to reduce e-waste and recover critical metals

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# ABSTRACT

According to Australia’s Critical Minerals Strategy 2023-2030, it should promote itself as a world leader in ESG performance by “adopting renewable fuel, reducing energy requirements, … for example through recycling and reprocessing materials”. Significant amount of e-waste will be produced in the same period. E-waste contains precious metals and metals of strategic interest for energy transition: copper, zinc, nickel, cobalt, tin, PGMs at concentrations higher than in primary ores. Furthermore, the Department of Climate Change, Energy, the Environment and Water is currently developing the “Regulation for small electrical products and solar photovoltaic system waste”, which will essentially restrict the disposal of e-waste in landfill and introduce liability for corporations that import or manufacture electronics or PV systems. The rapid rise of PV waste is of particular concern from environmental point of view since no standard economically viable methods exist for its recycling. The fees collected from importer/manufacturers are intended to facilitate the collection, sorting, disassembling, or shredding. The companies extracting critical minerals can benefit from pre-processed recycled materials both economically, and in terms of reputation, particularly if they choose to do metal refining in Australia. In the presentation, we demonstrate the case study of the pyrometallurgical options for the co-treatment of printed circuit boards and solar PV waste with either 1) copper concentrate using the existing infrastructure of Mount ISA copper smelter, or 2) recycled low-grade copper and copper-contaminated iron, using small-scale urban-based smelting technology. Case studies consist of process simulation using advanced FactSage© thermodynamic modelling and laboratory scale equilibration.