Special Issue

Advances in Recycling and Upcycling of Spent Lithium-Ion Batteries

Message from the Guest Editors

The rapid increase in demand for lithium-ion batteries (LIBs) for use in consumer electronics and electric vehicles (EVs) has led to serious concerns regarding the materials and environmental sustainability of wasted LIBs. Despite the benefits of enhanced LIB deployment, such as the lowering of carbon dioxide emissions and a reduction in the reliance on fossil fuels, spent LIBs containing metal elements (Li, Co, Ni, Mn) and flammable organic electrolytes are harmful to the environment if not disposed of or treated properly. It is therefore essential to develop an effective waste management plan for end-of-life LIBs that can mitigate environmental risks while also effectively recycling valuable materials. Therefore, this Special Issue focuses on advancements in the recycling of battery materials by highlighting innovative spent battery material separation processes, advanced resource regeneration technologies, the direct recycling of battery electrode materials, the modeling and analysis of economic and environmental impacts, and novel designs that enhance the sustainability of batteries and the integration of a circular economy.

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