

Scalable and Sustainable Recycling of Electric Vehicle Batteries

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The development electric vehicles (EVs) relies on lithium-ion battery (LIBs) with significantly improved performance and lower cost. The increasing amount of LIBs consumption will result in the resource shortage and price increase of lithium and precious transition metals (Co, Ni etc.) that are critical for making EV batteries. Today's recycling industry is practicing pyrometallurgical and hydrometallurgical processes to treat spent EV batteries. While the scalability has been approved, overall energy efficiency, processing cost and environmental impact remain to be much improved. Next generation technologies such as direct recycling can potentially offer a much lower cost and more energy-efficient alternative, but their scalability needs to be proved in industry scale. This talk will discuss the state-of-the-art EV battery recycling by comparing different technologies. We will also discuss the key challenges and offer some perspective for future development in EV battery recycling.

Bio

Dr. Zheng Chen is an Associate Professor in Department of NanoEngineering and Program of Chemical Engineering, and Materials Science and Engineering at UC San Diego. His research group has been focusing on energy storage and conversion materials as well as green processes, including battery chemistries for extreme temperatures, high energy cathodes, silicon/Li anodes, solid-state batteries and battery recycling and future manufacturing processes. He has published over 110 journal papers and holds 10 patents, with a total citation of 11000 times. Dr. Chen has received the NASA's 2018 Early Career Faculty Award, the LG Chem Global Battery Innovation Contest (BIC) Award in 2018, and the 2018 ACF PRF New Investigator Award. He has been selected as a Scialog Fellow in Advanced Energy Storage by Research Corporation and as a participant of 2019 China-America Frontiers of Engineering Symposium (CAFOE), National Academy of Engineering. He has been also recognized as a 2018 Emerging Investigator of *Journal of Materials Chemistry C*, 2020 *Chem. Comm.* Emerging Investigator and 2021 *Nanoscale* Emerging Investigator.