Shuji Owada et al., J Environ Waste Management and Recycling 2019, Volume 2

CONCENTRATION OF CATHODE MATERIALS FROM POST-CONSUMER LITHIUM-ION BATTERY BY ROASTING, SELECTIVE GRINDING AND PHYSICAL-PHYSICOCHEMICAL SEPARATION

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This study describes a concentration process of cathode materials, Co, Ni and Mn from post-consumer lithium-ion battery by applying roasting, selective grinding followed by various physical and physicochemical separation methods. Nowadays vast amount of lithium-ion batteries (LIBs) has been used for electric/electronic devices and various pyro- and hydro-metallurgical processes was developed for the recovery of the cathode materials from them but the concentration process from post-consumer batteries is still under the development. Roasting is one of the most radial method not only to discharge remaining electricity but also to achieve the phase transition of compositional materials in order to facilitate the recovery of valuable components and the rejection of useless/hazardous ones. Selective grinding and size classification divide the various materials into several characteristic size fractions. Flotation removes fine hydrophobic carbon particles and magnetic separation concentrates the cathode materials which were transformed into magnetic oxides and/or metal phases in the above roasting. Gravity separation such as wet tabling also concentrate on the heavy cathode materials from other light fractions. In this paper, author compares the various combinations of the above methods and proposes the best concentration flow, which could be economically feasible.

BIOGRAPHY

Shuji Owada has completed his Doctor of Engineering from Waseda University, Japan in 1984. After being Research Associate, Lecturer, Associate Professor, he became a Professor of Waseda University in 1995. He was assigned to the posts of President of Research Collaboration and Promotion Center, Vice-President of Environmental Research Institute, and Vice-Dean of School of Science and Engineering twice in the university. Outside the university, he experienced many roles in academic institutes, such as President of the Mining and Materials Processing Institute of Japan (MMIJ), President of the Resources Processing Society (RPSJ) of Japan and many governmental committee members in the field of recycling and environmental science and engineering. He is also visiting Professor of The University of Tokyo, Tohoku University and Akita University, Japan. He published over 100 original papers and over 700 presentations in domestic and overseas in the field of resources recycling and mineral processing.

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