

IONQUEST® RANGE PRODUCTS FOR METAL RECYCLING

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ABSTRACT

As of today, metal recycling is a vital process to reduce environmental impact, use fewer resources, and lower the production costs of new materials. In particular, with new challenging ores as raw materials and the increasing interest in metal recycling from secondary sources (e.g. recycled Li batteries), there is an unmet need for developing new solutions capable to selectively extract specific elements such as Mn, Co, Ni and Li and to fit the complexity of different metals matrices.

In this work, a solvent extraction study will be investigated starting from either a sulphate and chloride leach solution of spent cathode material. The data will highlight the improved selectivity and recovery of metals using organic phosphoric acidic extraction here named IONQUEST® products.

The influence of several experimental parameters was examined including aqueous phase pH, extractant concentration, aqueous/organic ratio and pre-neutralization of the extractant. An evaluation of the optimal pH gap between Ni vs Co and Co vs Mn was determined. Results demonstrate the improved selectivity performances for manganese using the strong acidic IONQUEST® 220 and cobalt using IONQUEST® 290 in several conditions. Based on the data collected, two sequential solvent extraction circuits to separate firstly manganese and eventually cobalt and nickel will be shown. The number of stages required for both extraction and stripping processes of cobalt, manganese and nickel was also evaluated.

Finally, the combination of two different extractants and/or the addition of a neutral one in different ratio will be presented aiming to improve the selectivity towards specific metal.

Key words: IONQUEST® products, spent Li-batteries, solvent extraction, selectivity