THE USE OF ION EXCHANGE RESINS TO PRODUCE HIGH PURITY COBALT AND NICKEL SULPHATE

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ABSTRACT

Ion exchange is widely used in hydrometallurgical operations for the recovery and purification of valuable metals, such as nickel and cobalt. The growth of the electric vehicle market has resulted in an increase in demand for metals used in the batteries. Although commonly referred to as lithium batteries, appreciable amounts of cobalt, nickel, manganese and other metals form part of these batteries.

The metal salts used in the manufacturing of EV batteries may be obtained from mining operations. Recycling of used batteries is a growing source of material, with recycling being mandated by law around the world. Regardless of the origin of the metals, there are a number of impurities present in the nickel/cobalt liquor that need to be removed to low levels, to produce precursor materials that are suitable for the production of high-quality batteries. Such impurities typically include iron, uranium, copper, zinc, nickel, cobalt, bismuth and antimony.

Special chelating resins have a high affinity for specific elements, allowing the selective removal of low levels of impurities from a background of highly concentrated valuable metal. Solvent-impregnated resins have been added to this group more recently, expanding the choice of sorbent.

In addition to choosing the right type of resin for the job, manipulation of the operating conditions, such as pH, provides additional selectivity. Choosing the optimum contactor design is critical to ensure consistent quality while at the same time being economically feasible and taking due consideration of incorporation of the ion exchange unit operation in the overall flowsheet.

This article takes a closer look at various applications of ion exchange in the production of high-purity cobalt and nickel sulphate.

Keywords: ion exchange, nickel sulphate, cobalt sulphate, purification, hydrometallurgy