Uranium Recovery as a By-product from Rare Earth Processing

M. Maley[1], S. Burling[2] and R. Ring[3]

1. Senior Hydrometallurgist, ANSTO, Lucas Heights, NSW, 2234 Email: mkm@ansto.gov.au
2. Senior Hydrometallurgist, ANSTO, Lucas Heights, NSW, 2234 Email: sbu@ansto.gov.au
3. Principal Consultant, ANSTO, Lucas Heights, NSW, 2234 Email: bjr@ansto.gov.au

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ABSTRACT

Critical minerals are predicted to play a key role in the transformation of the global energy sector, with overall demand expected to increase significantly over the next few decades. The critical minerals include lithium, nickel, cobalt, manganese, graphite and the rare earths. In comparison to the other critical minerals, recovery of rare earth elements, which are essential for permanent magnets in wind turbines and electric vehicle motors, poses the additional challenge of dealing with thorium and uranium.

While all rare earth recovery processes are designed to reject radionuclides and produce a product very low in radioactivity, the expansion of the industry will lead to processing of RE minerals with potentially higher uranium contents than those typically processed at present. This presents an opportunity to possibly recover uranium as a by-product, rather than reject it to waste tailings.

In this paper, possible flowsheet options for recovery of uranium as a by-product are reviewed and discussed. While the presence of higher uranium concentrations may have an upside, the increased concentrations of particular uranium progeny pose challenges for meeting target radioactivity concentrations in rare earth concentrate products. These challenges are also discussed, particularly in the context of product markets outside of China.