

## **RARE EARTH EXTRACTION WITH IONQUEST 801**

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## ABSTRACT

Rare earth elements (REEs) are indispensable components in the manufacturing of high-tech devices, renewable energy technologies, and defence applications. As global demand for these elements continues to rise, there is a pressing need to optimize extraction processes for both efficiency and environmental sustainability. This study explores approaches to rare earth extraction using IONQUEST 801 and integrates a predictive modelling to enhance process understanding and optimization.

We conducted a screening test varying process parameters such as temperature, pH, and reagent concentrations systematically to optimize extraction efficiency. Starting PLS solution was prepared in the lab with the following rare earth elements, La - Ce - Gd - Dy - Y at 0.02 M. The data obtained were used to develop empirical and mechanistic models to predict rare earth extraction yields and flowsheet.

Further tests were performed mixing specific concentration of different extractant and/or phase modifier. Our experimental results demonstrate the effectiveness of the proposed extraction methods, highlighting improvements in both yield and selectivity. The developed models successfully capture the complex relationships between process parameters and extraction efficiency, providing valuable insights for process optimization.

Keywords: Rare earth extraction, selectivity, modelling