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James T.M. Amphlett, Mark D. Ogden, Richard I. Foster, Neilesh Syna, Karin H. Soldenhoff, Clint A. Sharrad

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# The Effect of Contaminants on the Application of Polyamine Functionalised Ion Exchange Resins for Uranium Extraction from Sulfate Based Mining Process Waters

James T. M. Amphlett<sup>a,b</sup>, Mark D. Ogden<sup>b</sup>, Richard I. Foster<sup>a,c</sup>, Neilesh Syna<sup>d</sup>, Karin H. Soldenhoff<sup>d</sup>, Clint A. Sharrad<sup>a\*</sup>

<sup>a</sup> School of Chemical Engineering and Analytical Science, The University of Manchester, Oxford Road, Manchester, M13 9PL, United Kingdom

<sup>b</sup> Separations and Nuclear Chemical Engineering Research (SNUCER), Department of Chemical and Biological Engineering, The University of Sheffield, Mappin Street, Sheffield, S1 3JD, United Kingdom

<sup>c</sup> Decommissioning Technology Research Division, Korea Atomic Energy Research Institute, Daejeon, Republic of Korea

<sup>d</sup> ANSTO Minerals, Australian Nuclear Science and Technology Organisation, Locked Bag 2001, Kirrawee D. C., NSW 2232, Australia

\*Corresponding author: [clint.a.sharrad@manchester.ac.uk](mailto:clint.a.sharrad@manchester.ac.uk)

## Abstract

Three in-house produced polyamine functionalised ion exchange resins and Purolite S985 (a commercial ion exchange resin) have been assessed for their ability to extract  $\text{UO}_2^{2+}$  from a variety of aqueous matrices applicable to current and potential future uranium mining processes. The uptake of common contaminant species in uranium processing liquors at variable acid concentrations has been assessed, with  $\text{Al}^{3+}$  and  $\text{MoO}_4^{2-}$  showing the most extraction, with  $\text{AsO}_4^{3-}$ ,  $\text{Eu}^{3+}$  and  $\text{Fe}^{3+}$  showing extractions  $> 10\%$  at low  $[\text{H}^+]$ . Extraction of  $\text{MoO}_4^{2-}$ ,  $\text{AsO}_4^{3-}$ ,  $\text{Eu}^{3+}$  and  $\text{Fe}^{3+}$  was seen to decrease with increasing  $[\text{H}^+]$ . The impact of increasing  $[\text{Cl}^-]$  on  $\text{UO}_2^{2+}$  and  $\text{Fe}^{3+}$  extraction has been determined.  $\text{Fe}^{3+}$  showed low extractions by all resins, with no dependence on  $[\text{Cl}^-]$ . In contrast, increasing suppression of  $\text{UO}_2^{2+}$  uptake was seen with increasing  $[\text{Cl}^-]$  up to  $80\text{ g L}^{-1}$ , with extraction remaining

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