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## Novel extractant impregnated resin for preconcentration and determination of uranium from environmental samples

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### Abstract

A novel method based on impregnation of Amberlite XAD-4 with extractant isonitroso-4-methyl-2-pentanone (IMP) has been developed for  $U^{6+}$  extraction and determination in various samples. The prepared extractant impregnated resin (EIR) sorbent was characterized by several techniques including the field emission scanning electron microscope. The sorbent was packed in a glass column and investigated for various parameters such as pH, eluent, sample and eluent flow rates to optimize sorption desorption conditions for  $U^{6+}$ .  $U^{6+}$  is quantitatively determined at pH 4 with flow rate 2 mL/min with recovery of 98.9 %. The sorption behaviour of  $U^{6+}$  by EIR was also studied using different equilibrium isotherms and kinetic models and the experimental data confirmed that it follows Freundlich isotherm and Weber-Morris pore diffusion kinetics models. The investigation of foreign ions influence on  $U^{6+}$  sorption showed least interference and thus, facilitated its extraction and determination in Uranmicrolite (leachate) ore tailing, synthetic mixtures and spiked water samples. The detection limit was 0.41  $\mu\text{g/L}$  while the limit of quantification as 1.35  $\mu\text{g/L}$  made the method quite accurate.

**Key words:** Uranium determination; Isonitroso-4-methyl-2-pentanone; Amberlite XAD-4; Solid phase extraction; Uranium recovery.

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