

## † Electronic Supplementary Information

### Superparamagnetic bi-functional composite bead for thermal ionization mass spectrometry of plutonium(IV) ions

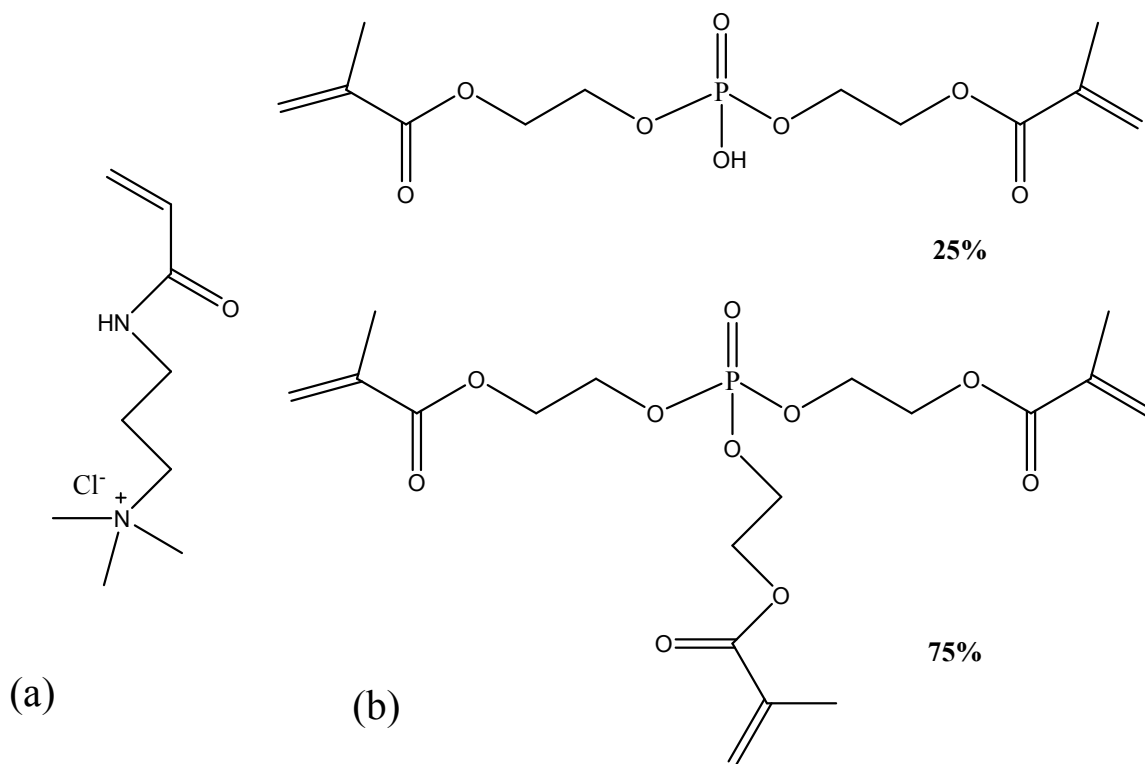
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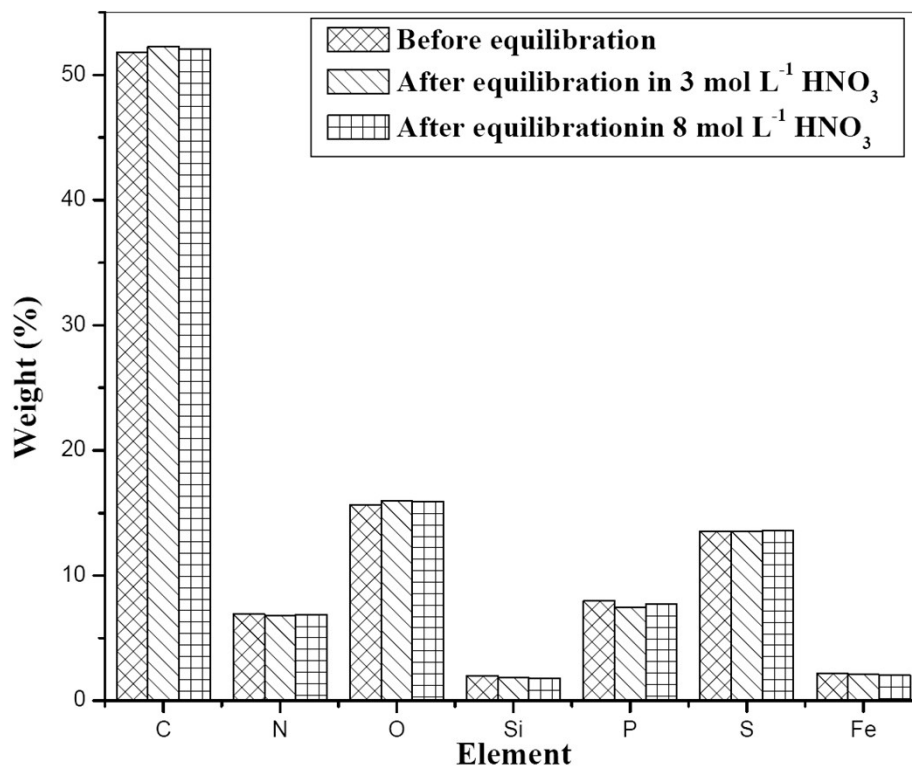
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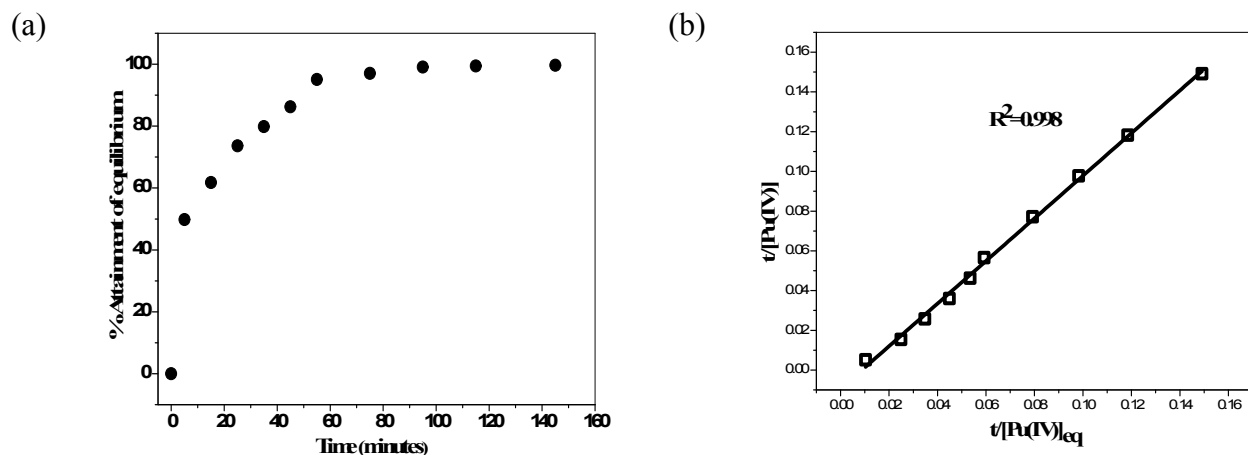
**Scheme S1.** Chemical structures of 3-(acrylamido propyl) trimethylammonium chloride (a) and phosphoric acid 2-hydroxyethyl methacrylate ester (b) used for grafting on the PES beads.



**Fig. S1** Comparison of elemental profiles of poly(HEMP-co-APTAC) grafted magnetic PES beads before and after subjecting to the equilibrations with 3 and 8 mol L<sup>-1</sup> HNO<sub>3</sub>.



**Fig. S2** Attainment of sorption equilibrium of Pu(IV) and pseudo-second order rate of sorption of Pu(IV) by poly(HEMP-co-APTAC) grafted magnetic PES bead in 3 M HNO<sub>3</sub>.

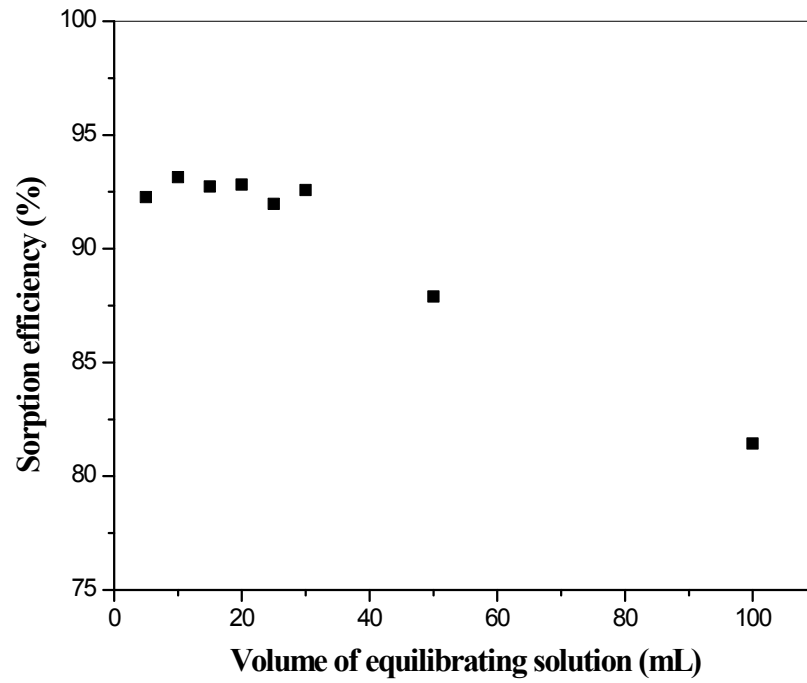


The sorption rate profile could be fitted to linearized pseudo-second order rate equation given below, which is normally observed in chemical sorption of ions at tracer concentration into the sorbent.

$$\frac{t}{Q_t} = \frac{1}{K_2 Q_e^2} + \frac{t}{Q_e}$$

where  $Q_t$  and  $Q_e$  are the amounts of solute sorbed per unit weight of the sorbent at time  $t$  and at equilibrium, respectively, and  $K_2$  is the pseudo-second-order rate constant of sorption.

**Fig. S3** Effect of volume on extraction efficiency of Pu(IV) by poly(HEMP-co-APTAC) grafted magnetic PES bead in 3 M HNO<sub>3</sub> medium.



**Fig. S4** Effect of degassing time prior to TIMS analysis on the standard deviation of observed isotope ratios.

