Supplementary data

Deep eutectic solvent-based extraction of uranium(VI) from a wide range acidity and subsequent determination by direct loading in thermal ionization mass spectrometry

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Table S1 :Composition of DES:

TOPO:IA DES	Mole Fraction of TOPO	Mole Fraction of Itaconic Acid	Appearance of Mixture
A	**0.1**	**0.9**	Thick Gel
B	**0.3**	**0.7**	Highly viscous liquid
C	**0.4**	**0.6**	Highly viscous liquid
D	**0.5**	**0.5**	Free flowing liquid
E	**0.6**	**0.4**	Free flowing liquid
F	**0.8**	**0.2**	Highly viscous liquid

Fig. S1.DSC thermogram of the TOPO:IA DES having 0.6:0.4 mole proportions.

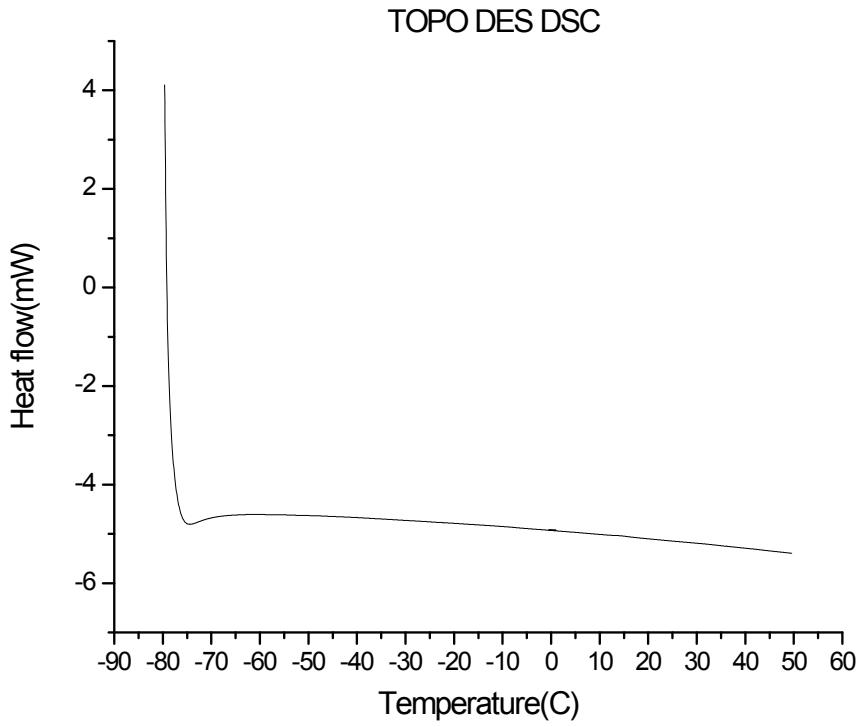


Fig. S2.Effect of time on extraction of Uranium.

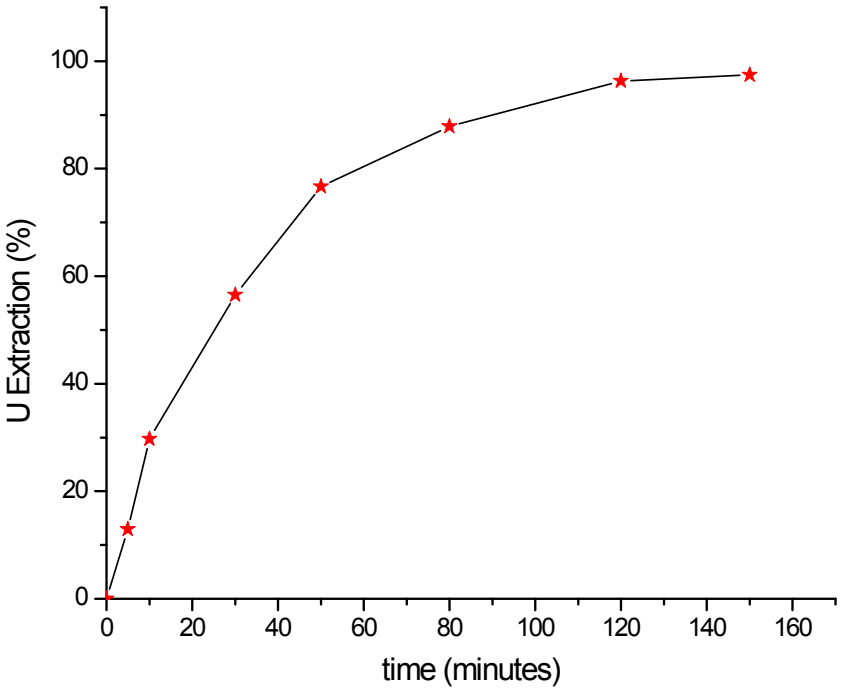
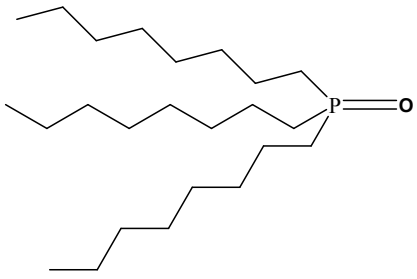


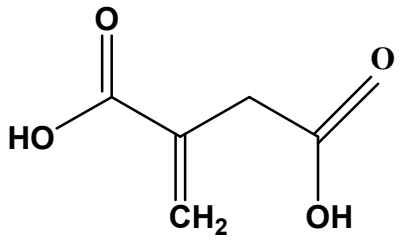
Table S2. Variation of extraction efficiency and distribution coefficient (K_d, $mL.g^{-1}$) of U(VI) in the TOPO:IA-PP as a function pH in the equilibrating solution.

pH	Extraction Efficiency (%)	Weight of Membrane (g)	K_d ($mL.g^{-1}$)
1	86	0.0214	2871
3	87	0.0186	3521
5	90	0.0214	4109
7	89	0.0219	3608
9	88	0.0213	3527

Chemical Structure and properties of TOPO and Itaconic Acid:



Trioctylphosphineoxide: Molecular Formula : $C_{24}H_{51}OP$;Molar Mass: 386.635 g/mol; Density :0.861g/cm^3; Melting Point : 50-55℃;Solubility in water: Insoluble.



Itaconic Acid (methylidenesuccinic acid): Molecular Formula: $C_5H_6O_4$; Molar Mass: 128.084 g/mol; Melting Point: 166-167 ℃; Solubility in water: 1 g/12 mL.

Synthetic ground water was prepared as per composition mentioned in reference.[28]

Chemical Constituent	Concentration(mg/L)
pH (units)	8.1
Ca^{2+}	35
Mg^{2+}	80
Na^{+}	740
K^{+}	7
CO_3^{2-}	25
HCO_3^{-}	435
Cl^{-}	1015
SO_4^{2-}	185
NO_3^{-}	29
F^{-}	1

Synthetic urine was prepared as per composition mentioned in reference.[29]

Composition of synthetic urine sample

Chemical Constituent	Concentration (g L^{-1})
pH (units)	6
Urea	20
NaCl	6.3
K_2HPO_4	4.9
$MgCl_2$ anhydrous	0.35
$CaCl_2$dihydrate	0.43
Citric acid monohydrate	1.0

Composition of Seawater

U concentration = $1.4x10^{-8}$ mol/L (3.3 mg/m^3). *pH* = 7.5-8.5,

Salt conc.: [NaCl] = 0.55 mol/L, [HCO_3^-]= 2.5 mmol/L, [SO_4^{2-}] = 27 mmol/L *Na=10770 ppm, Mg = 1290 ppm,*

Ca = 412 ppm,

K =3 80 ppm

Si, Li, Rb, I, Ba, Mo = 2-0.01 ppm,

As, U, V, Ti, Fe = 0.004 - 0.001 ppm

Zn, Ni, Al, Cs, Cr, Sb, Se, Mn,Cu,W = 0.0005-0.0001 ppm