

**Supporting material for “Functionalized graphene nanoplatelets: a promising adsorbent for solid-phase uranium extraction”**

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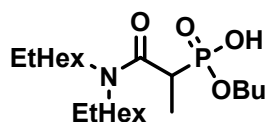
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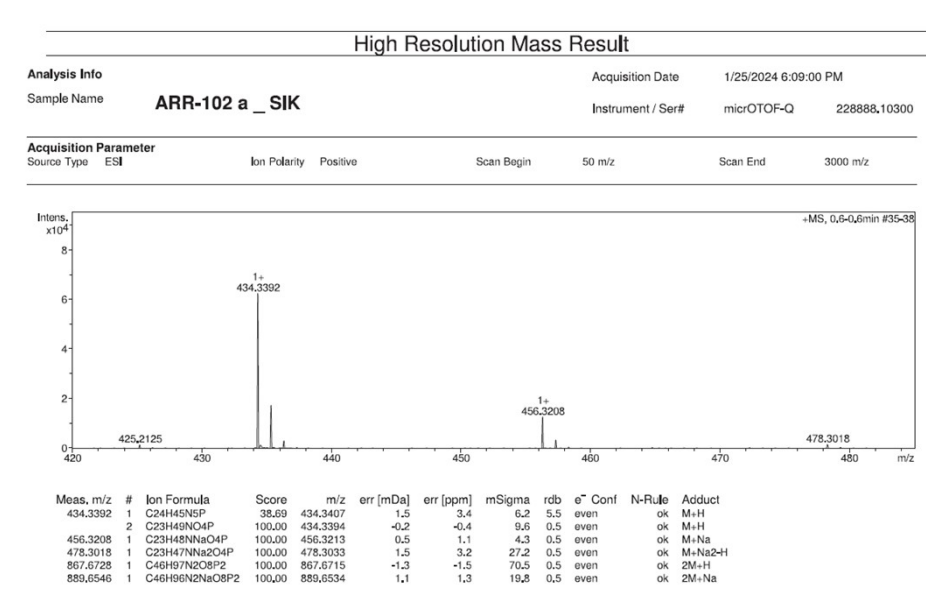
Solution  $^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra were recorded on a Bruker 400 ultrashield VS spectrometer (Larmor frequencies, 400.13 MHz for  $^1\text{H}$ , 161.976 MHz for  $^{31}\text{P}$ , 100.613 MHz for  $^{13}\text{C}$ ) using deuterated chloroform as the solvent and internal standard.



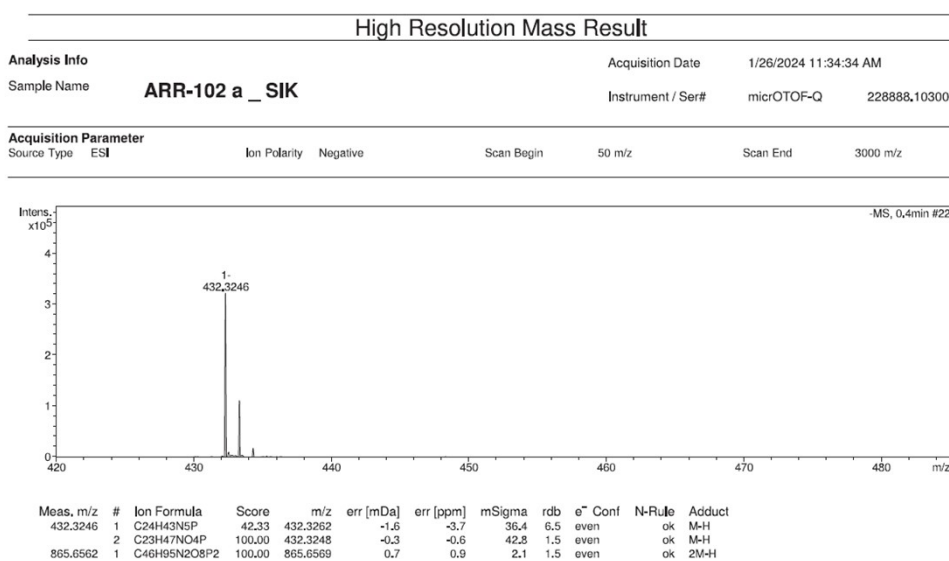
**DEHCEBP**

**Fig. S1.** Structural formula of Di-2-EthylHexylCarbamoylEthylButyl Phosphonate (DEHCEBP).

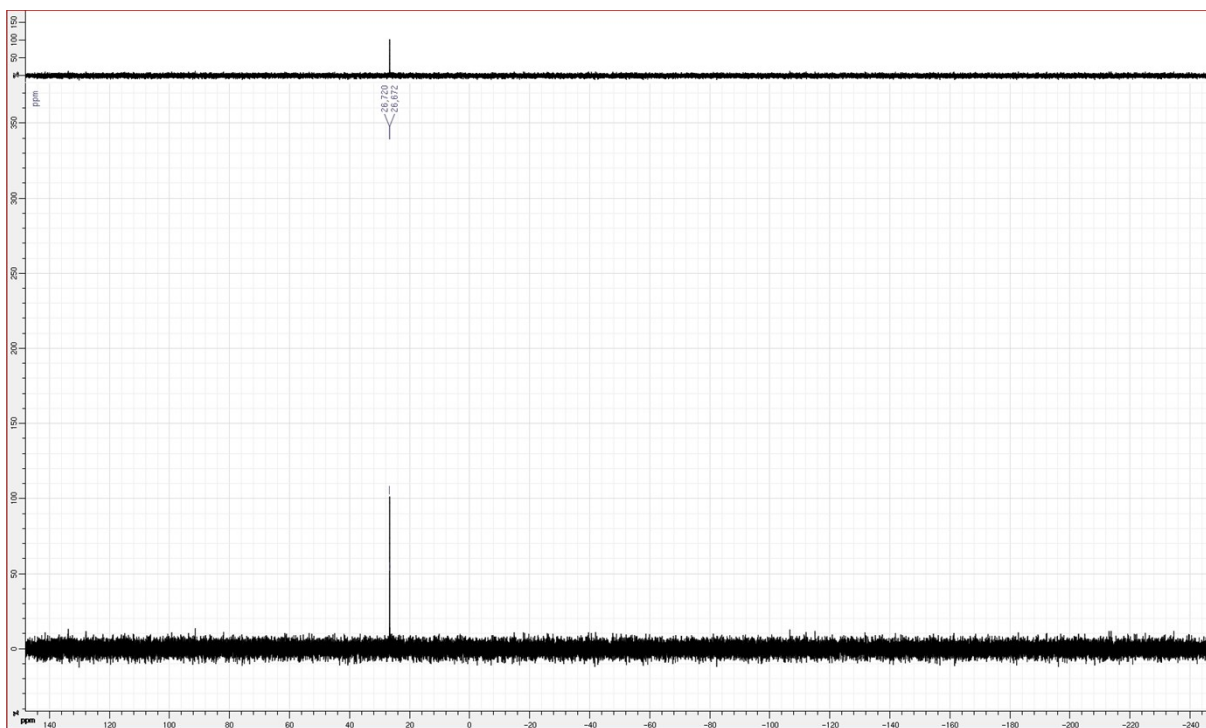
Analyses were performed on a Bruker Micro Q tof Mass spectrometer



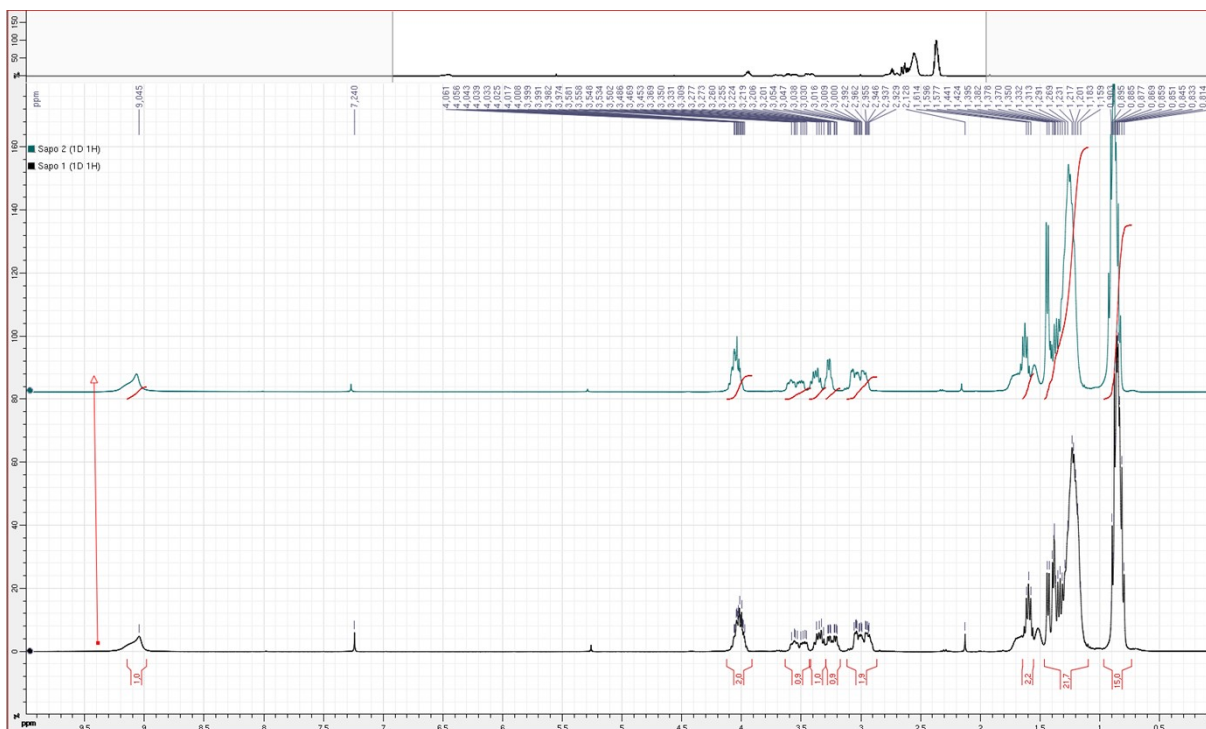
**Fig. S2.** + mode mass spectrum calculated for  $C_{23}H_{49}NO_4P^+$  = 434.3394; found= 434,3392.



**Fig. S3.** - mode mass spectrum calculated for  $C_{23}H_{47}NO_4P^-$  = 432.3248; found= 432,3246.

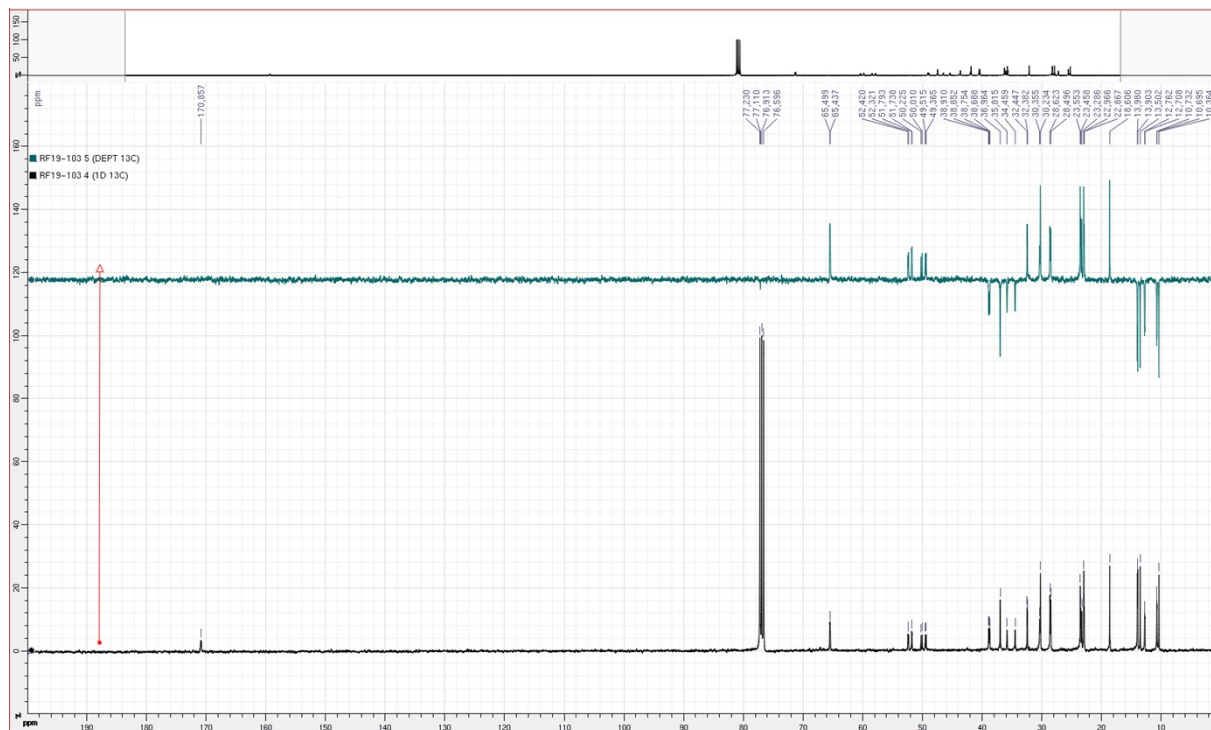


**Fig. S4.**  $^{31}\text{P}$  NMR spectrum ( $\text{CDCl}_3$ , 162 MHz) of Di-2-EthylHexylCarbamoylEthylButyl Phosphonate (DEHCEBP).  $\delta$  (ppm), 26.7.

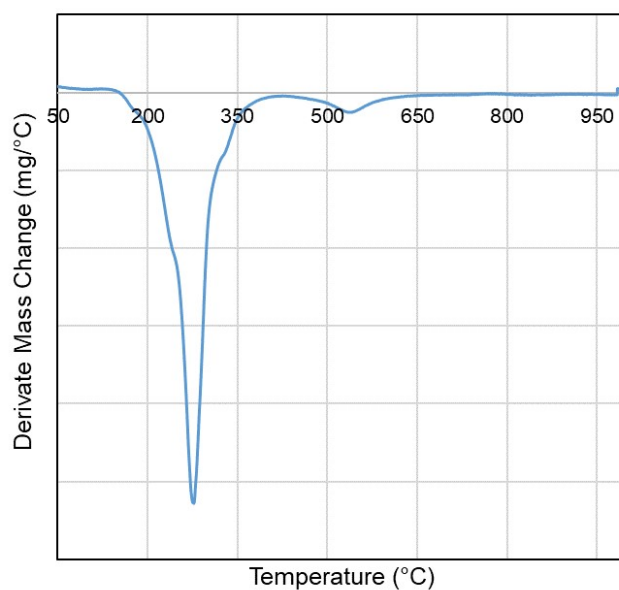


**Fig. S5.**  $^1\text{H}$  NMR spectrum ( $\text{CDCl}_3$ , 400 MHz,  $25^\circ\text{C}$ ) of Di-2-EthylHexylCarbamoylEthylButyl Phosphonate (DEHCEBP).  $\delta$  (ppm): 9.04 (broad s, 1H, POH); 4.06-3.97 (m, 2H, P-O- $\text{CH}_2$ - $\text{CH}_2$ -); 3.62 – 3.30 (m, 2H, CH- $\text{CH}_2$ -N); 3.29-3.20 (m, 1H, CO- $\text{CH}(\text{CH}_3)$ -P), 3.09-2.86 (m, 2H, CH- $\text{CH}_2$ -N); 1.64

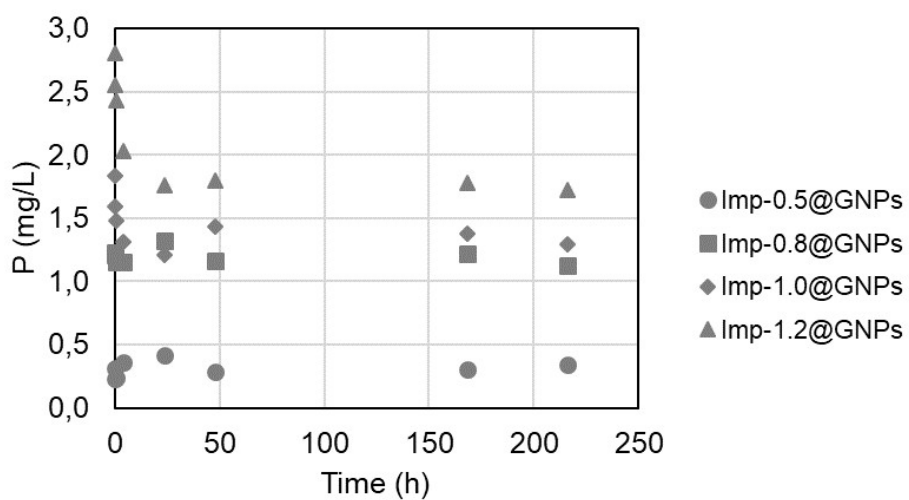
-1.55 (m, 2H,  $CH-CH_2-N$ ), 1.44 – 1.16 (m, 21H,  $CH_2$ , &  $CO-CH(CH_3)-P$ ); 0.91 – 0.78 (m, 15H,  $CH_2-CH_3$ ).



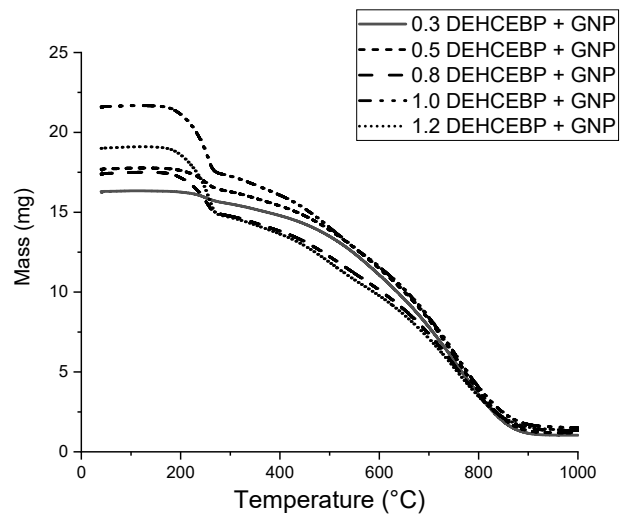
**Fig. S6.**  $^{13}C$  NMR spectrum ( $CDCl_3$ , 100 MHz,  $25^\circ C$ ) of Di-2-EthylHexylCarbamoylEthylButyl Phosphonate (DEHCEBP).  $\delta$  (ppm): 170.8 (C=O), 65.5 (P-O- $CH_2$ ), 52.3; 51.78, 50.2, 49.4 ( $CH-CH_2-N$ ), 38.8 ( $CH-CH_2-N$ ), 36.9 (P-C- $CH_3$ ), 35.1 (d,  $J_{C-P}=135Hz$ , P-C- $CH_3$ ); 32.4 ( $CH_2$ ), 30.3 ( $CH_2$ ), 28.6 ( $CH_2$ ), 23.8 ( $CH_2$ ), 22.9 ( $CH_2$ ) 18.6 ( $CH_2$ ), 13.9 ( $CH_3$ ), 13.5 ( $CH_3$ ), 12.7 ( $CH_3$ ), 10.7 ( $CH_3$ ), 10.3 ( $CH_3$ ).



**Fig. S7.** Differential thermogravimetric curve the DEHCEBP ligand.



**Fig. S8.** Phosphorous concentration in solution release by impregnated GNPs-based materials with DEHCEBP concentrations of 0.5–1.2 mmol·g<sup>-1</sup>. Accurate values could not be determined for the material with DEHCEBP concentration of 0.3 mmol·g<sup>-1</sup> because the low phosphorus concentration values were smaller than the associated measurement errors.



**Fig. S9** Thermogravimetric curve for DEHCEBP + GNP ligands.