Electronic Supplementary Information

Ionic liquid-coated Fe₃O₄ magnetic nanoparticles as adsorbent of mixed hemimicelles solid-phase extraction for preconcentration of polycyclic aromatic hydrocarbons in environmental samples

Qianli Zhang, Fei Yang, Fei Tang, Kai Zeng, Kangkang Wu,

Qingyun Cai*, Shouzhuo Yao*

State Key Lab of Chemo/Biosensing & Chemometrics, College of Chemistry & Chemical Engineering, Hunan University, Changsha 410082, China

Correspondence: Prof. Shouzhuo Yao. State Key Lab of Chemo/Biosensing & Chemometrics, College of Chemistry & Chemical Engineering, Hunan University, Changsha 410082, China. Fax: +86-731-88821848. Email: szyao@hnu.cn.

This supporting information contains 3 figures.
1. NMR and MS characterizations of the prepared ILs

The prepared ILs were characterized by NMR (Figure S1) and mass spectrometry (Figure S2). The positive ion mode (ESI+) was used for MS analysis. The ESI/MS conditions were as follows: capillary voltage, 3.5 kV; cone voltage, 30 V; range of mass scan, 100–800; desolvation temperature, 250 °C; source temperature, 105 °C; flow rate of desolvation gas, 350 L h⁻¹, nitrogen; flow rate of cone gas, 50 L h⁻¹, nitrogen.

Figure S1. ¹H NMR spectrum of ILs.
2. **IR spectroscopy of IL-coated Fe$_3$O$_4$ NPs**

IR spectroscopy has been employed to qualitatively examine adsorption of C$_{16}$mimBr onto Fe$_3$O$_4$ NPs surface. Figure S3 displays the IR spectrum of the Fe$_3$O$_4$ NPs and the C$_{16}$mimBr coated Fe$_3$O$_4$ NPs. Four characteristic bands can be distinguished in the IR spectrum of C$_{16}$mimBr coated Fe$_3$O$_4$ NPs, while not observed in the Fe$_3$O$_4$ NPs IR spectrum. Compared with the standard spectrum, the adsorption
bands at 2921 and 2852 cm\(^{-1}\) could be attributed to the stretching vibration of C-H band; the characteristic bands at 1571 and 1469 cm\(^{-1}\) indicate the vibration of N-H in imidazole ring. All of these bands revealed that C\(_{16}\)mimBr was successfully modified on the surface of Fe\(_3\)O\(_4\) NPs.

Figure S3. IR spectroscopy of Fe\(_3\)O\(_4\) NPs (a) and C\(_{16}\)mimBr coated Fe\(_3\)O\(_4\) NPs (b).