

Electronic supplementary information

Extraction of Au(III) from hydrochloric acid media by a novel amide-based ionic liquid

Xiaoxia Liu, Yang Wu, Yangyang Wang, Huiying Wei*, Jinxin Guo*, Yanzhao Yang*

Key Laboratory for Special Functional Aggregate Materials of Education Ministry, School of Chemistry and Chemical Engineering, Shandong University, Jinan, 250100, P. R. China.

Number of pages: 3

Number of figures: 3

Number of Text: 1

Number of Table: 1

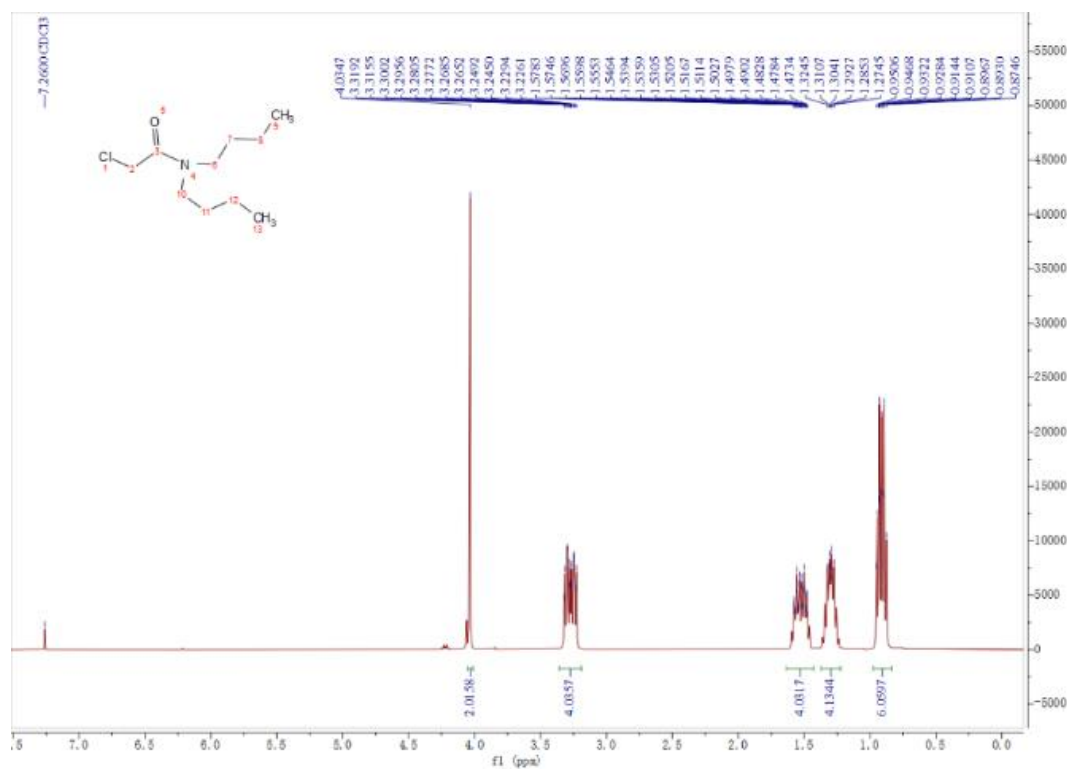
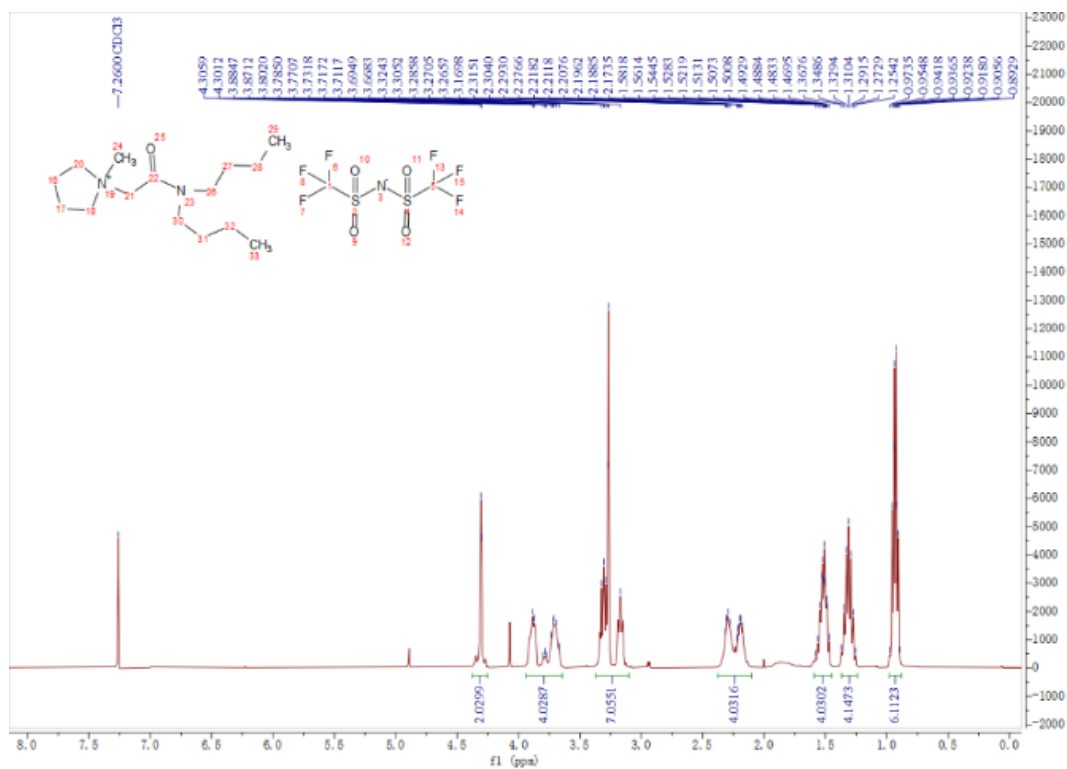


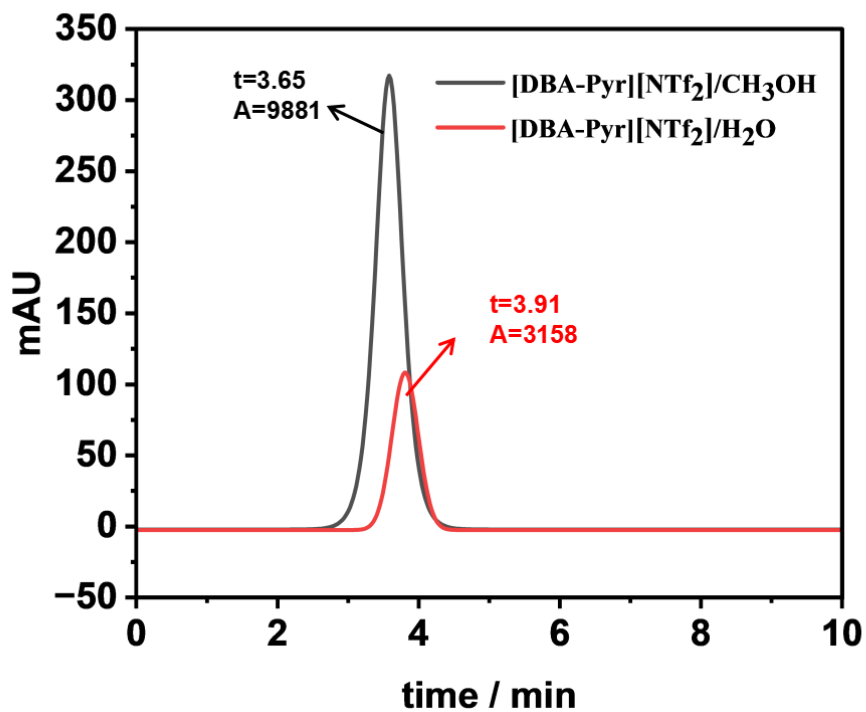
Fig. S1 ¹H NMR spectra of *N,N*-di-*n*-butyl-2-chloroacetamide.



1

2

Fig. S2 ¹H NMR spectra of [DBA-Pyr][NTf₂].



3

4

Fig. S3 High performance liquid chromatography (HPLC) of [DBA-Pyr][NTf₂]

5

1 **Text S1.** Selection of diluent of [DBA-Pyr][NTf₂] for extraction of Au(III).

2 The choice of diluent often depends on many factors, such as safety, extraction efficiency,
3 physical properties of diluent, etc. As shown in Table. S1, the effects of solvent extraction of gold
4 with seven diluents were compared. Firstly, chloroform and toluene have good solubility in ionic
5 liquids, while other organic solvents cannot dissolve ionic liquids. Compared with other organic
6 solvents, chloroform can obtain the highest extraction efficiency as a diluent. The extraction
7 efficiency in chloroform is 1.31 times that in toluene, and the extraction efficiency in chloroform is
8 1.48 times that in solvent-free. In addition, chloroform has low viscosity and high density, which is
9 beneficial to improve mass transfer rate and phase separation. The above properties show that
10 chloroform has certain advantages as diluent. To sum up, although chloroform will do some harm
11 to human health, considering various aspects, we finally choose chloroform as the diluent in this
12 work.

13

14 **Table S1.** Selection of diluent.

| diluent | chloroform | toluene | solvent-free | hexane | kerosene | Caproic acid |
|-------------------|------------|---------|--------------|--------|----------|--------------|
| solubility to IL | √ | √ | | × | × | × |
| E (%) | 78.73 | 60.01 | 53.11 | 61.01 | 58.10 | 52.57 |
| density (g/mL) | 1.48 | 0.87 | | | | |
| viscosity (mPa·s) | 0.57 | 0.59 | | | | |

15