

## Supporting Information

### Experimental

#### Prepare of TFIL

TFIL, 1-methyl-3-(2'-mercaptoacetoxyethyl)imidazolium hexafluorophosphate, was prepared from 1-methylimidazole, 1-chloro-2-ethanol, mercaptoacetic acid, and KPF<sub>6</sub> according to the method from literatures <sup>1,2</sup> (see Scheme S1).

#### Fabrication of the heated TFIL/Au electrode

The construction of heated Au-disk electrode is shown schematically in Fig. S1. An Au wire (1 mm in diameter), was wound by Cu enameled wire (130 μm in diameter) as a heater. The “twin-wire-wound coil” was used as a winding coil method, which could cancel the magnetic field produced by the current passing through the Cu enameled wire <sup>3</sup>. For expediting the temperature response, the gold wire twisted by copper wire was sealed with the thermally conductive adhesive, and dried at room temperature for 24 h. Then, the heated Au electrode was inserted into a silent stock tube, which was filled with epoxy resin, and the acquired electrode was dried at room temperature for 24 h.

#### References

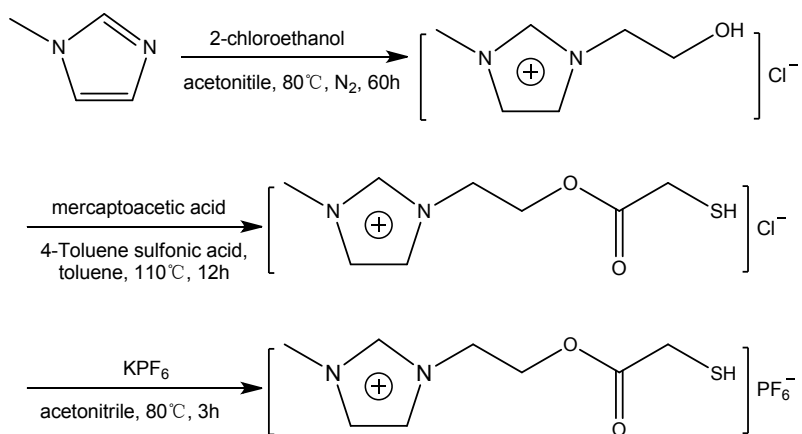
- [1] Itoh, H.; Naka, K.; Chujo, Y. *J. Am. Chem. Soc.* **2004**, *126*, 3026–3027.
- [2] Kim, K.S.; Dembereinyamba, D.; Lee, H. *Langmuir* **2004**, *20*, 556–560.
- [3] Chen, Q.Z.; Fang, Y.M.; Wei, H.; Huang, Z.X.; Chen, G.N.; Sun, J.J. *Analyst* **2010**, *135*, 1124–1130.

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25 **Scheme S1**

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29 **Scheme 1.** Synthesis of 1-methyl-3-(2'-mercaptoacetoxylethyl)imidazolium

30 hexafluorophosphate

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43 **Fig. S1**

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54 **Fig. S1** The stereogram (A) and bottom view (B) of the heated Au electrode.

55 a, Au wire; b, epoxy resin; c, thermally conductive adhesive; d, silent stock tube; e,

56 Cu enameled wire.

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