

## 偶氮苯基型离子液体溶液对空气中湿度的变色响应

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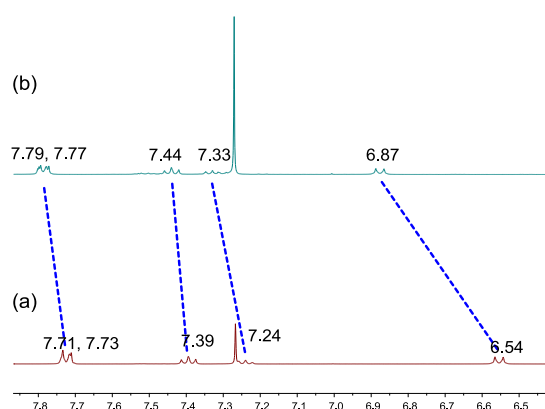
## Moisture-Responsive Behavior in the Azophenolic Ionic Liquid Solution Accompanied by A Naked-Eye Color Change

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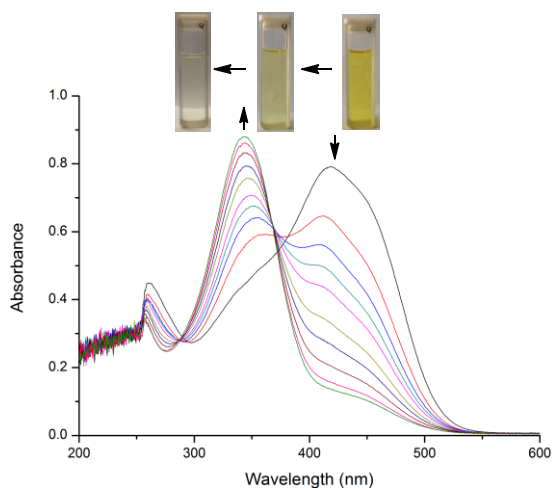
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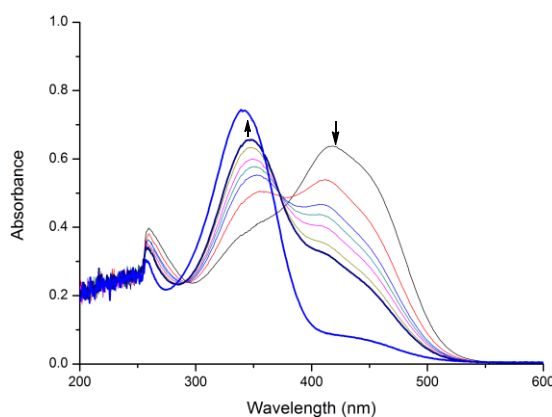
**Fig. S1** Partial  $^1\text{H}$  NMR spectrum (400 MHz,  $\text{CDCl}_3$ , room temperature) of the fresh  $[\text{P}_{66614}][\text{PhN}=\text{NPhO}]$  solution (a), then after 3 days (b).

The concentration of  $[\text{P}_{66614}][\text{PhN}=\text{NPhO}]$  was  $20.0 \text{ mmol}\cdot\text{L}^{-1}$ .



**Fig. S2** UV-Vis absorption spectra of  $[\text{P}_{66614}][\text{PhN}=\text{NPhO}]$  solution (solvent,  $\text{CCl}_4$ ) in visible light for 0, 5, 10, 15, 20, 30, 40, 60, 90, 120 min at  $25^\circ\text{C}$ .

Inset: the naked-eye color change during the UV-Vis spectroscopic measurement (2 h). The concentration of  $[\text{P}_{66614}][\text{PhN}=\text{NPhO}]$  was  $5.2 \times 10^{-5} \text{ mol}\cdot\text{L}^{-1}$ .



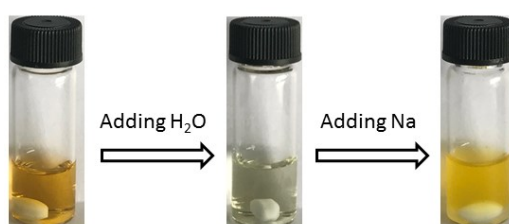
**Fig. S3** UV-Vis absorption spectra of  $[\text{P}_{66614}][\text{PhN}=\text{NPhO}]$  solution (solvent,  $\text{CCl}_4$ ) in dark for 0, 5, 10, 15, 20, 30, 40 min (the navy bold line) compared with the control in visible light for 40 min (the blue bold line) at  $25^\circ\text{C}$ .

The concentration of  $[\text{P}_{66614}][\text{PhN}=\text{NPhO}]$  was  $5.0 \times 10^{-5} \text{ mol}\cdot\text{L}^{-1}$ .



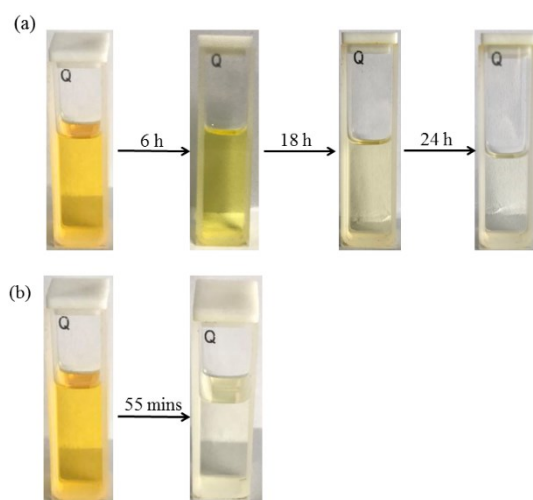
**Fig. S4** The color change from orange to yellow after CO<sub>2</sub> bubbling in [P<sub>66614</sub>][PhN=NPhO] CHCl<sub>3</sub> solution.

The concentration of [P<sub>66614</sub>][PhN=NPhO] was  $5.2 \times 10^{-5}$  mol·L<sup>-1</sup>.



**Fig. S5** The color change from the original orange to faint yellow, then to light orange after addition H<sub>2</sub>O and Na in [P<sub>66614</sub>][PhN=NPhO] MeCN solution respectively.

The concentration of [P<sub>66614</sub>][PhN=NPhO] was around  $5.0 \times 10^{-5}$  mol·L<sup>-1</sup>.



**Fig. S6** The color change of [P<sub>66614</sub>][PhN=NPhO] CHCl<sub>3</sub> solution at 25 °C: (a) under the relative humidity of 28%, (b) under the relative humidity of 100%.

The concentration of [P<sub>66614</sub>][PhN=NPhO] was  $5.2 \times 10^{-5}$  mol·L<sup>-1</sup>.