

Investigation on Gold Dissolution Performance and Mechanism in Imidazolium Cyanate Ionic Liquids

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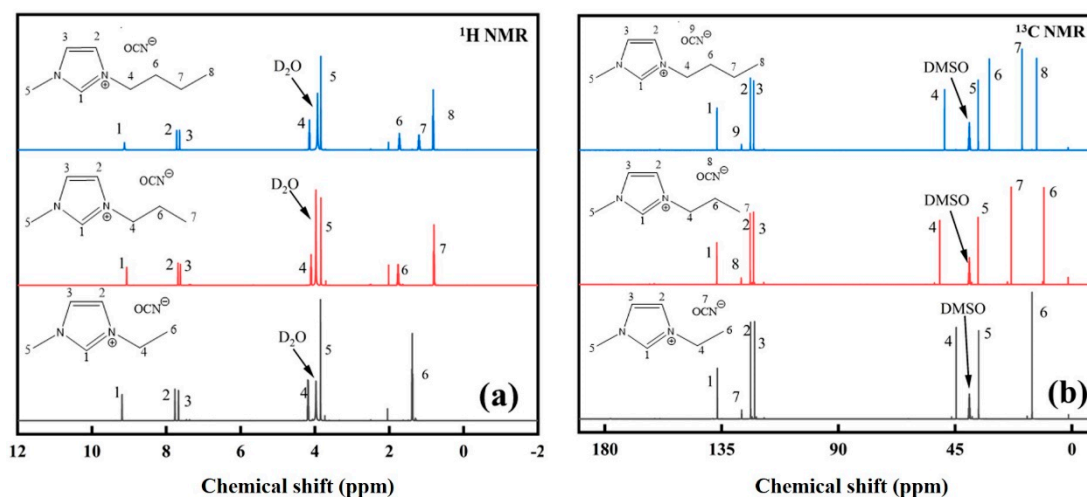


Figure S1 (a) ¹H NMR spectra of three imidazolium cyanate ionic liquids [C₂MIM][OCN], [C₃MIM][OCN] and [C₄MIM][OCN]. (b) ¹³C NMR spectra of three imidazolium cyanate ionic liquids [C₂MIM][OCN], [C₃MIM][OCN] and [C₄MIM][OCN]

NMR investigation data.

[C₂MIM][OCN]: ¹H NMR (600 MHz, DMSO-d₆): δ ppm = 9.19 (d, J = 1.7 Hz, 1H), 7.77 (t, J = 1.8 Hz, 1H), 7.67 (t, J = 1.8 Hz, 1H), 4.18 (q, J = 7.3 Hz, 2H), 3.85 (s, 3H), 1.38 (t, J = 7.3 Hz, 3H). ¹³C NMR (151 MHz, DMSO-d₆): δ ppm = 136.64, 127.30, 123.83, 122.26, 44.59, 35.93, 15.35.

[C₃MIM][OCN]: ¹H NMR (600MHz, DMSO-d₆): δ ppm = 9.07 (d, J = 1.7 Hz, 1H), 7.69 (t, J = 1.8 Hz, 1H), 7.62 (t, J = 1.8 Hz, 1H), 4.10 (t, J = 7.1 Hz, 2H), 3.84 (s, 3H), 1.76 (dt, J = 14.6, 7.3 Hz, 2H), 0.80 (t, J = 7.4 Hz, 3H). ¹³C NMR (151 MHz, DMSO-d₆): δ ppm = 136.86, 127.47, 124.01, 122.71, 50.91, 36.13, 23.37, 10.77.

[C₄MIM][OCN]: ¹H NMR (600MHz, DMSO-d₆): δ ppm = 9.12 (s, 1H), 7.72 (d, J = 2.0 Hz, 1H), 7.64 (d, J = 2.0 Hz, 1H), 4.15 (t, J = 7.2 Hz, 2H), 3.84 (s, 3H), 1.77–1.69 (m, 2H), 1.25–1.15 (m, 2H), 0.82 (t, J = 7.4 Hz, 3H). ¹³C NMR (151 MHz, DMSO-d₆): δ ppm = 136.81, 127.38, 123.93, 122.66, 49.07, 36.10, 31.81, 19.18, 13.58.

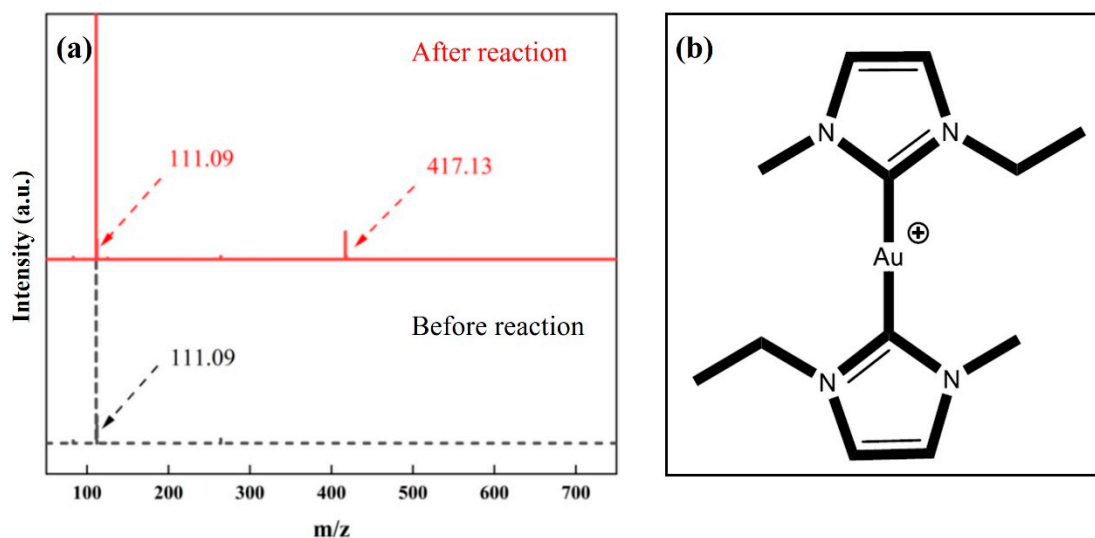


Figure S2. (a) ESI-MS spectra of [C₂MIM][OCN] before and after gold dissolution in [C₂MIM][OCN] mixed with H₂O (10 wt. %) at 60 °C for 24 h. (b) The structure of the gold complex (m/z 417.13) generated in gold dissolution by [C₂MIM][OCN].

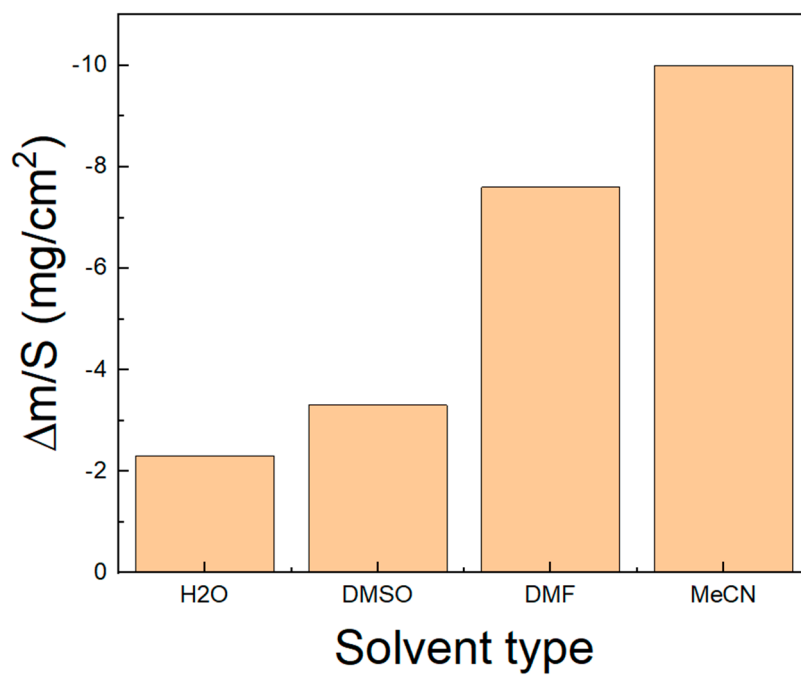


Figure S3. Weight loss of gold leaf in [C₄MIM][OCN] mixed with different solvents (10 wt. %) for 24h at 60 °C.