Electronic Supplementary Information

Direct dissolution of UO_2 by carboxyl-functionalized ionic liquids in the presence or absence of Fe-containing ionic liquids

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(a)  (b) 

Fig. S1 Dissolution of UO_2 (a) in single [HOOCMmim][Tf_2N] IL at 120 °C, and (b) in the mixture of [Bmim][$FeCl_4$] and [HOOCMmim][Tf_2N] at 180 °C.

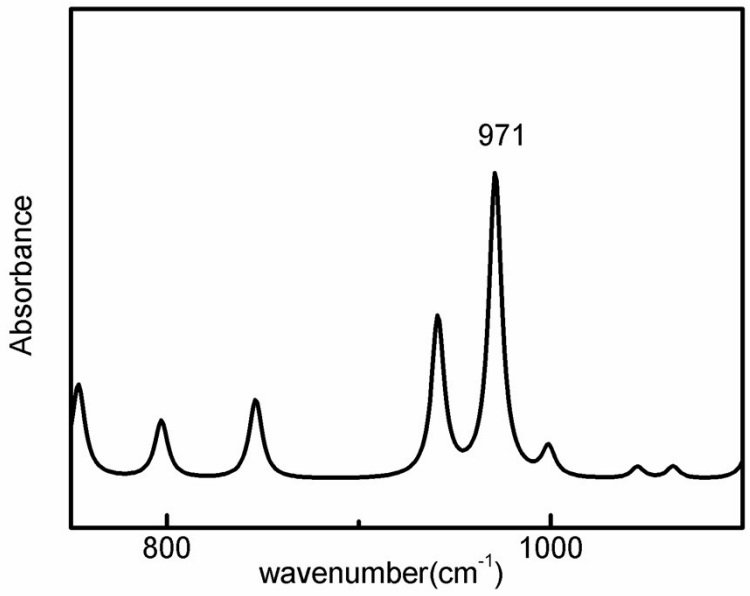

Fig. S2 The IR spectrum of $[UO_2(OOCMmim)_3]^{2+}$ obtained in gas phase by the B3LYP/6-311G(d, p)/D3BJ level.

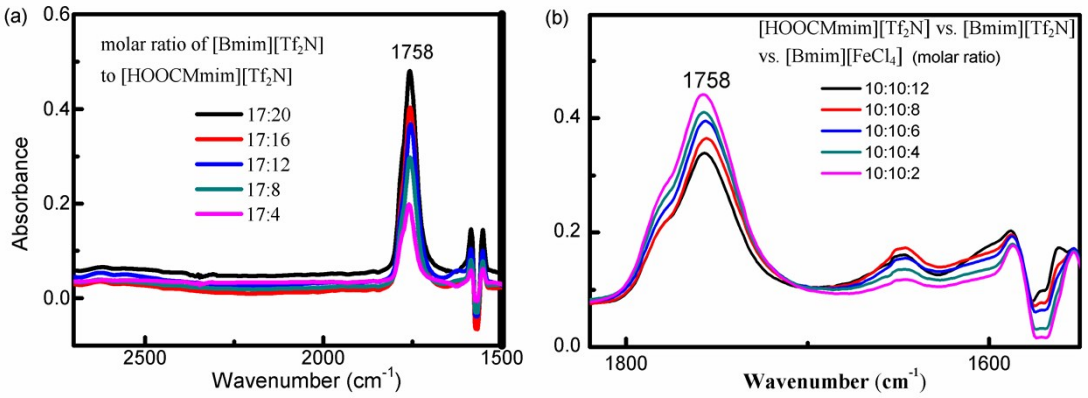

Fig. S3 IR spectra for the mixture with a various molar ratio (a) [HOOCMmim][Tf_2N] and [Bmim][Tf_2N], and (b) [Bmim][$FeCl_4$], [Bmim][Tf_2N] and [HOOCMmim][Tf_2N].

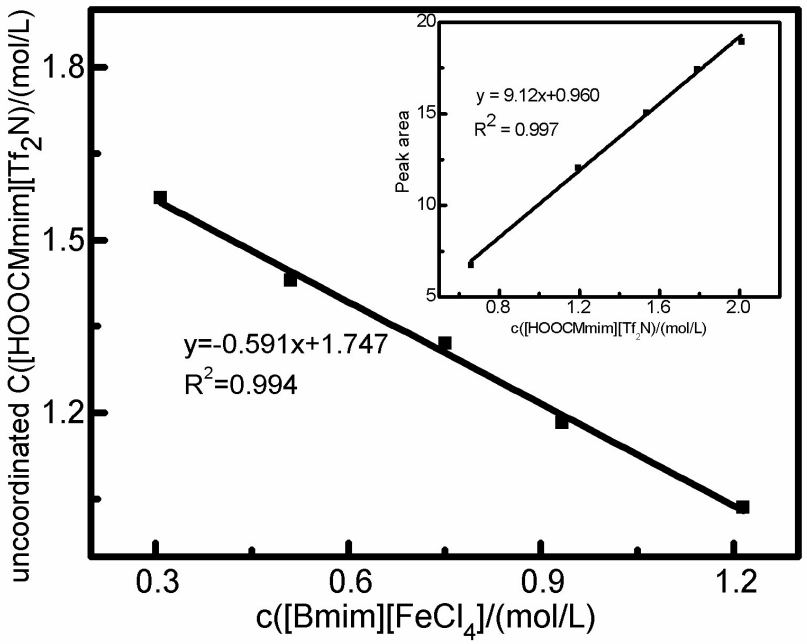

Fig. S4 The linear relationship between the uncoordinated [HOOCMmim][Tf_2N] and [Bmim][$FeCl_4$] (the inserted graph: the linear relationship between the peak area at 1758 cm^{-1} and the known concentration of [HOOCMmim][Tf_2N]).

Table S1 The cyclic voltammetric behavior of [Imim][$FeCl_4$] in [Imim][Tf_2N].

[Imim]$FeCl_4$	V(V/s)	E_{pc}/V	I_{pc}/μA	E_{pa}/V	I_{pa}/μA	I_{pa}/I_{pc}	$E_{1/2}$/V (vs Ag^+/Ag)	ΔE/mV
[Emim]$FeCl_4$ 0.01mol/L	0.02	-0.579	-12.19	-0.509	12.18	1.00	-0.544	70
	0.05	-0.588	-18.89	-0.502	18.80	1.00	-0.545	86
	0.075	-0.593	-22.13	-0.492	22.18	1.00	-0.543	101
	0.1	-0.596	-25.67	-0.493	25.72	1.00	-0.545	103
	0.2	-0.614	-33.99	-0.476	33.94	1.00	-0.545	138
[Bmim]$FeCl_4$ 0.01mol/L	0.02	-0.596	-11.72	-0.511	11.59	0.99	-0.554	85
	0.05	-0.605	-14.36	-0.499	14.19	0.99	-0.552	106
	0.075	-0.607	-17.24	-0.496	16.67	0.97	-0.552	111
	0.1	-0.613	-19.18	-0.492	18.58	0.97	-0.553	121
	0.2	-0.624	-26.55	-0.482	25.57	0.96	-0.553	141

Table. S2 Dissolution amount of UO_2 in 0.5 mL of the carboxyl-functionalized ILs in atmospheric condition.

0.5mL [HOOCMmim][Tf_2N] (0.683 g)		0.5mL [HOOCEtmim][Tf_2N] (0.727 g)	
Temperature (^oC)	dissolved UO_2 (mg)	Temperature (^oC)	dissolved UO_2 (mg)
60	1.17	60	0.73
90	4.82	90	7.81
140	16.7	140	17.5