Supplementary information

Table S1: EXAFS fit results. N is the coordination number (± 20 %), R is the interatomic distance (± 0.01 Å), σ^2 is the Debye-Waller factor (± 0.001Å²), E_0 is the shift in energy. R_{factor} indicates the goodness of the fit according to [37].

* Fixed parameter, # linked parameter

Sample ID	paths	N	R (Å)	σ^2 (Å²)	E_0 (eV)	R_{factor}
Sample A	Oax	2*	1.78	0.002	5.1	0.04
	O (DMDBMA)	5.8	2.38	0.007		
	C	4.8	3.42	0.006		
	MS ax	2#	3.56#	0.004*		
	MS C-O-C	11.6#	3.53#	0.008#		
	MS O-C-O-C	5.8#	3.60#	0.008#		
S1_0_1	Oax	2*	1.77	0.002	4.5	0.06
	O	6.0	2.40	0.010		
	C	2.0	3.45	0.007		
	MS ax	2#	3.54#	0.004*		
	MS C-O-C	4#	3.55#	0.008#		
	MS O-C-O-C	2#	3.63#	0.008#		
S1_0_2	Oax	2*	1.77	0.002	4.5	0.05
	O (DMDBMA)	5.7	2.38	0.008		
	C	4.0	3.43	0.005		
	MS ax	2#	3.55#	0.004#		
	MS C-O-C	8#	3.53#	0.008#		
	MS O-C-O-C	4#	3.61#	0.008#		
S1_0_3	Oax	2*	1.78	0.002	4.5	0.05
	O (DMDBMA)	5.7	2.37	0.007		
	C	4.5	3.42	0.005		
	MS ax	2#	3.56#	0.004#		
	MS C-O-C	9#	3.53#	0.008#		
	MS O-C-O-C	4.5#	3.61#	0.008#		
S1_0_4	Oax	2*	1.77	0.002	3.2	0.05
	O (DMDBMA)	5.7	2.37	0.007		
	C	5.8	3.42	0.006		
	MS ax	2#	3.56#	0.004#		
	MS C-O-C	11.4#	3.53#	0.008#		
	MS O-C-O-C	5.7#	3.60#	0.008#		
Sample B	Oax	2*	1.77	0.002	5.0	0.03
	O (DMDBMA)	2.2	2.37	0.005		
	O (NO_3^-)	3.8	2.52	0.005		
	C	2.2#	3.47	0.004		
	MS ax	2#	3.55#	0.003#		
	MS C-O-C	4.5#	3.55#	0.008#		
	MS O-C-O-C	2.2#	3.62#	0.007#		
	N	1.9	2.95	0.003		
	Od	1.9#	4.21	0.005		
	MS Od	3.8#	4.21#	0.005#		
	MS Od	1.9#	4.21#	0.005#		
S1_1_2	O	2*	1.78	0.002	5.2	0.03
	O(DMDBMA)	3.6	2.36	0.005		
	O (NO_3^-)	2.4	2.51	0.005		
	C	3.6#	3.44	0.006		
	MS ax	2#	3.56#	0.003#		
	MS C-O-C	7.3#	3.53#	0.008#		
	MS O-C-O-C	3.6#	3.61#	0.007#		
	N	1.2#	2.93	0.004		
	Od	1.2#	4.21	0.006		
	MS Od	2.4#	4.21#	0.006#		
	MS Od	1.2#	4.21#	0.006#		

S1_2_2	O	2*	1.78	0.002	5.3	0.05
	O(DMDBMA)	3.0	2.36	0.006		
	O (NO_3^-)	3.0	2.52	0.006		
	C	3.0#	3.45	0.005		
	MS ax	2#	3.56#	0.004#		
	MS C-O-C	6.0#	3.54#	0.008#		
	MS O-C-O-C	3.0#	3.61#	0.007#		
	N	1.5#	2.95	0.003		
	Od	1.5#	4.21	0.005		
	MS Od	3.0#	4.21#	0.005#		
	MS Od	1.5#	4.21#	0.005#		
S1_3_2	O	2*	1.78	0.002	4.5	0.04
	O(DMDBMA)	2.6	2.37	0.006		
	O (NO_3^-)	3.4	2.52	0.006		
	C	2.6#	3.45	0.006		
	MS ax	2#	3.56#	0.003#		
	MS C-O-C	5.1#	3.54#	0.008#		
	MS O-C-O-C	2.6#	3.62#	0.008#		
	N	1.7#	2.95	0.004		
	Od	1.7#	4.21	0.005		
	MS Od	3.4#	4.21#	0.005#		
	MS Od	1.7#	4.21#	0.005#		
S1_2_1	O	2*	1.78	0.002	5.5	0.05
	O(DMDBMA)	2.0	2.36	0.006		
	O (NO_3^-)	4.0	2.51	0.006		
	C	2.0#	3.46	0.005		
	MS ax	2#	3.56#	0.003#		
	MS C-O-C	4.0#	3.54#	0.008#		
	MS O-C-O-C	2.0#	3.61#	0.008#		
	N	2.0#	2.95	0.003		
	Od	2.0#	4.21	0.005		
	MS Od	4.0#	4.21#	0.005#		
	MS Od	2.0#	4.21#	0.005#		
DCE	O	2*	1.77	0.002	4.6	0.03
	O(DMDBMA)	2.3	2.36	0.004		
	O (NO_3^-)	3.7	2.51	0.004		
	C	2.3#	3.45	0.005		
	MS ax	2#	3.56#	0.003#		
	MS C-O-C	4.6#	3.53#	0.008#		
	MS O-C-O-C	2.3#	3.61#	0.011#		
	N	1.8#	2.94	0.002		
	Od	1.8#	4.20	0.006		
	MS Od	3.7#	4.20#	0.006#		
	MS Od	1.8#	4.20#	0.006#		

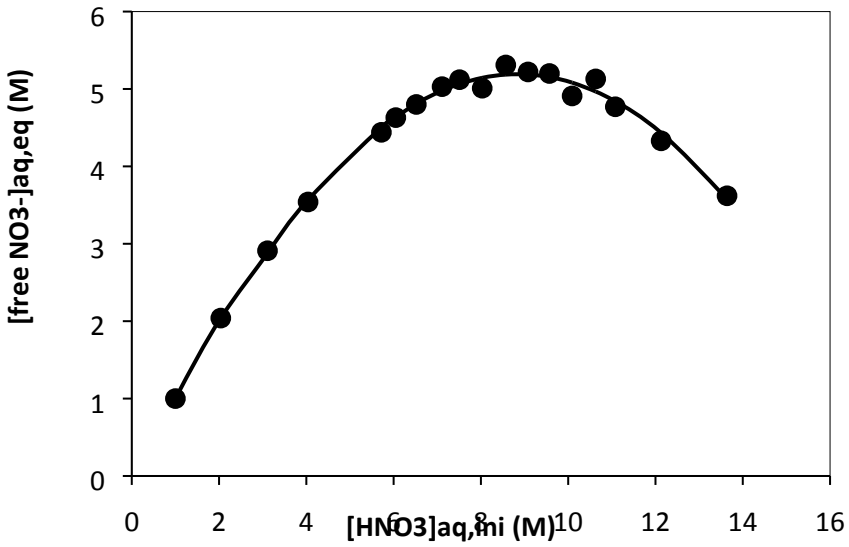

Figure S1: Free nitrate concentration in aqueous solution as a function of the initial nitric acid concentration, as given by [44] (dots). The solid line represents the data fit used in this study.

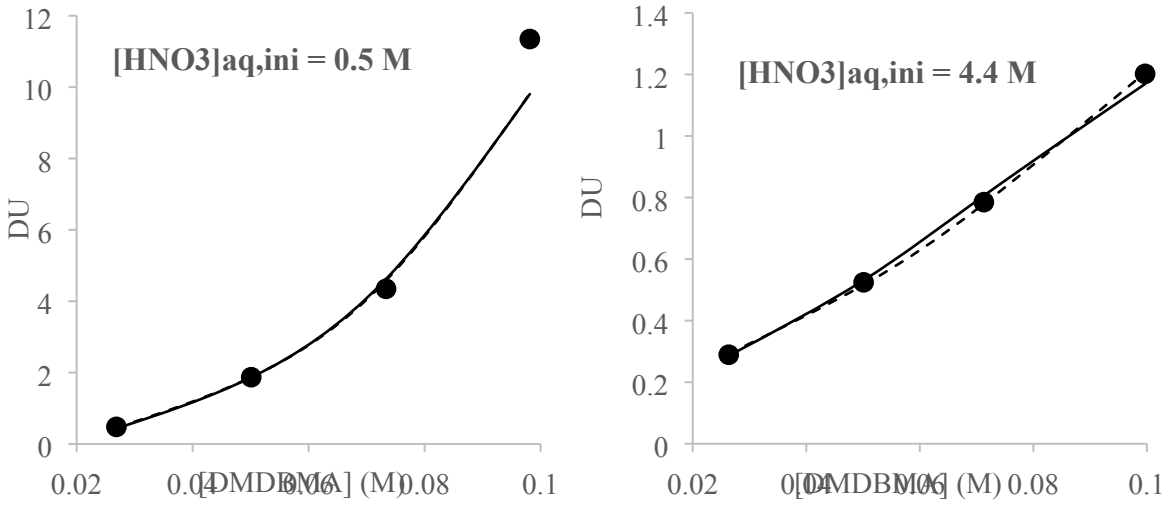

Figure S2: Evolution of the uranium distribution coefficient as a function of the DMDBMA concentration in the IL phase, at two HNO_3 concentrations: 0.5 M (left) and 4.4 M (right). Lines represent data fits obtained by the model explained in part 4, taking into account the aqueous Tf_2N^- concentrations values: model from [34] (dotted lines) and new model developed in this paper (solid lines).