

Rotational Diffusion of Nonpolar and Ionic Solutes in 1-Alkyl-3-Methylimidazolium bis(trifluoromethanesulfonyl)imides: Is Solute Rotation Always Influenced by the Length of the Alkyl Chain on the Imidazolium Cation?

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Supporting Information

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TABLE 1: Reorientation Times of 9-PA, FL and R110 in [mmim⁺][Tf2N⁻] as a Function of Temperature Along with Solvent Viscosity

T / K	$\eta / \text{mPa s}$	τ_r / ns		
		9-PA	FL	R110
298	37.1	1.02	4.88	4.39
303	30.8	0.86	4.20	3.68
308	26.4	0.70	3.41	3.00
313	22.7	0.60	2.74	2.51
318	19.6	0.53	2.29	2.07
323	17.2	0.43	1.93	1.76
328	15.1	0.38	1.64	1.50
338	12.0	0.29	1.18	1.11
348	9.7	0.23	0.90	0.87

TABLE 2: Reorientation Times of 9-PA, FL and R110 in [emim⁺][Tf2N⁻] as a Function of Temperature Along with Solvent Viscosity

T / K	$\eta / \text{mPa s}$	τ_r / ns		
		9-PA	FL	R110
298	32.4	0.96	4.38	4.11
303	27.4	0.83	3.47	3.27
308	23.4	0.63	2.82	2.82
313	20.2	0.56	2.30	2.36
318	17.6	0.49	1.91	2.04
323	15.4	0.45	1.58	1.71
328	13.7	0.37	1.31	1.51
338	10.9	0.30	0.91	1.13
348	8.8	0.21	0.68	0.87

TABLE 3: Reorientation Times of 9-PA, FL and R110 in [mpim⁺][Tf2N⁻] as a Function of Temperature Along with Solvent Viscosity

T / K	$\eta / \text{mPa s}$	τ_r / ns		
		9-PA	FL	R110
298	45.2	1.22	6.01	5.59
303	36.9	1.01	4.92	4.52
308	30.9	0.82	3.67	3.72
313	26.1	0.68	2.87	3.12
318	22.1	0.55	2.35	2.57
323	19.1	0.48	1.86	2.17
328	16.7	0.40	1.54	1.83
338	12.9	0.31	1.06	1.41
348	10.2	0.25	0.77	1.04

TABLE 4: Reorientation Times of 9-PA, FL and R110 in [bmim⁺][Tf2N⁻] as a Function of Temperature Along with Solvent Viscosity

<i>T</i> / K	<i>η</i> / mPa s	<i>τ_r</i> / ns		
		9-PA	FL	[†] R110
298	50.2	1.40	5.97	6.79
303	41.1	1.16	4.57	5.48
308	33.8	0.97	3.67	4.65
313	28.5	0.82	3.11	3.68
318	24.1	0.68	2.52	2.95
323	20.7	0.58	2.15	2.40
328	17.9	0.49	1.86	2.02
338	13.7	0.37	1.27	1.47
348	10.9	0.28	1.00	1.09

[†]Data for R110 from 313–348 K has been taken from ref 16.

TABLE 5: Reorientation Times of 9-PA, FL and R110 in [hmim⁺][Tf2N⁻] as a Function of Temperature Along with Solvent Viscosity

T / K	$\eta / \text{mPa s}$	τ_r / ns		
		9-PA	FL	R110
298	68.8	1.67	8.99	7.43
303	55.8	1.34	7.03	6.32
308	45.9	0.99	5.31	5.38
313	37.8	0.90	4.11	4.59
318	31.5	0.71	3.42	3.85
323	26.5	0.61	2.80	3.22
328	22.7	0.52	2.34	2.83
338	16.9	0.39	1.72	2.03
348	13.1	0.27	1.22	1.47