

Electronic supplementary information

ESI 1 Refractive index n_D at the sodium line ($\lambda_D = 589.3$ nm), refractive index difference $n_F - n_C$ for the Fraunhofer lines F ($\lambda_F = 486.1$ nm) and C ($\lambda_C = 656.3$ nm), and mutual diffusion coefficients D_{12} of binary mixtures of [EMIM][EtSO₄] + solvents

solvent	x_{solvent}	T/K	n_D	$n_F - n_C$	$D_{12}/10^{-9} \text{ m}^2 \text{ s}^{-1}$
acetone	0.000	293.15	1.4796	0.0096	-
	0.101	293.15	1.4758	0.0092	0.0714
	0.200	293.15	1.4735	0.0094	0.0878
	0.301	293.15	1.4673	0.0095	0.114
	0.501	293.15	1.4554	0.0091	0.204
	0.701	293.15	1.4331	0.0088	0.257
	0.800	283.15	1.4218	0.0080	0.223
	0.800	288.15	1.4201	0.0079	0.244
	0.800	293.15	1.4181	0.0085	0.269
	0.800	298.15	1.4172	0.0082	0.292
	0.800	303.15	1.4157	0.0083	0.309
	0.800	308.15	1.4141	0.0083	0.336
	0.800	313.15	1.4130	0.0081	0.360
	0.800	318.15	1.4117	0.0085	0.381
	0.800	323.15	1.4104	0.0085	0.414
	0.900	293.15	1.3931	0.0081	0.317
	0.950	293.15	1.3788	0.0077	0.448
	0.975	293.15	1.3702	0.0075	0.624
	0.990	293.15	1.3634	0.0073	1.18
	0.995	293.15	1.3602	0.0072	1.78
1.000	293.15	1.3585	0.0068	-	
acetonitrile	0.100	293.15	1.4778	0.0096	0.0532
	0.201	293.15	1.4747	0.0094	0.0834
	0.301	293.15	1.4700	0.0094	0.109
	0.503	293.15	1.4565	0.0092	0.214
	0.701	293.15	1.4353	0.0085	0.387
	0.800	293.15	1.4200	0.0076	0.535
	0.900	293.15	1.3913	0.0069	0.745
	0.950	293.15	1.3709	0.0066	0.942
	0.975	293.15	1.3591	0.0062	1.22
	0.990	293.15	1.3510	0.0063	1.72
	0.995	293.15	1.3498	0.0063	1.82
	1.000	293.15	1.3439	0.0061	-

dichloromethan	0.304	293.15	1.4762	0.0095	0.111
	0.500	293.15	1.4718	0.0093	0.192
	0.701	293.15	1.4639	0.0092	0.325
	0.801	293.15	1.4573	0.0092	0.394
	0.900	293.15	1.4491	0.0089	0.484
	0.950	293.15	1.4420	0.0087	0.463
	0.975	293.15	1.4355	0.0086	0.453
	0.990	293.15	1.4304	0.0085	0.537
	0.995	293.15	1.4290	0.0085	0.919
	1.000	293.15	1.4249	0.0084	-
ethanol	0.101	293.15	1.4762	0.0096	0.0460
	0.201	293.15	1.4724	0.0096	0.0595
	0.302	293.15	1.4689	0.0096	0.0829
	0.501	293.15	1.4570	0.0094	0.138
	0.701	293.15	1.4346	0.0087	0.224
	0.800	293.15	1.4196	0.0083	0.258
	0.900	293.15	1.3964	0.0077	0.295
	0.950	293.15	1.3811	0.0072	0.330
	0.969	293.15	1.3761	0.0072	0.354
	0.990	293.15	1.3662	0.0066	0.398
water	0.101	293.15	1.4788	0.0097	0.108
	0.202	293.15	1.4780	0.0099	0.145
	0.306	293.15	1.4743	0.0097	0.198
	0.500	293.15	1.4684	0.0090	0.223
	0.700	293.15	1.4562	0.0089	0.291
	0.800	293.15	1.4428	0.0090	0.412
	0.900	293.15	1.4147	0.0083	0.504
	0.950	293.15	1.3879	0.0075	0.521
	0.975	293.15	1.3643	0.0082	0.559
	0.990	293.15	1.3476	0.0069	0.632
	0.995	293.15	1.3410	0.0066	1.14
	1.000	293.15	1.3330	0.0060	-

ESI 2 Refractive index n_D at the sodium line ($\lambda_D = 589.3$ nm), refractive index difference $n_F - n_C$ for the Fraunhofer lines F ($\lambda_F = 486.1$ nm) and C ($\lambda_C = 656.3$ nm), and mutual diffusion coefficients D_{12} of binary mixtures of [EMIM][MeSO₃] + solvents

solvent	x_{solvent}	T/K	n_D	$n_F - n_C$	$D_{12}/10^{-9} \text{ m}^2 \text{ s}^{-1}$
acetone	0.000	293.15	1.4968	0.0076	-
	0.051	293.15	1.4948	0.0102	0.0369
	0.095	293.15	1.4930	0.0101	0.0401
	0.203	278.15	1.4920	0.0090	0.0327
	0.203	283.15	1.4905	0.0088	0.0406
	0.203	288.15	1.4896	0.0089	0.0535
	0.203	293.15	1.4875	0.0087	0.0738
	0.203	298.15	1.4870	0.0087	0.0857
	0.203	303.15	1.4856	0.0100	0.0990
	0.203	308.15	1.4842	0.0088	0.125
	0.302	293.15	1.4818	0.0098	0.0911
	0.502	278.15	1.4708	0.0084	0.0965
	0.502	283.15	1.4679	0.0084	0.107
	0.502	288.15	1.4673	0.0084	0.125
	0.502	293.15	1.4662	0.0083	0.145
	0.502	298.15	1.4648	0.0081	0.167
	0.502	303.15	1.4658	0.0083	0.193
	0.502	308.15	1.4609	0.0092	0.214
	0.701	278.15	1.4444	0.0090	0.0812
	0.701	283.15	1.4433	0.0087	0.0893
	0.701	288.15	1.4417	0.0089	0.101
	0.701	293.15	1.4410	0.0090	0.116
	0.701	298.15	1.4389	0.0088	0.132
	0.701	303.15	1.4363	0.0089	0.145
	0.701	308.15	1.4351	0.0087	0.167
	0.801	293.15	1.4205	-	0.0366
0.950	293.15	1.3796	-	0.189	
0.975	293.15	1.3690	0.0075	0.549	
0.990	293.15	1.3636	0.0070	0.984	
methanol	0.106	293.15	1.4928	0.0075	0.0701
	0.188	293.15	1.4903	0.0101	0.101
	0.300	293.15	1.4846	0.0100	0.114
	0.503	293.15	1.4689	0.0096	0.233
	0.700	293.15	1.4428	0.0088	0.477
	0.869	293.15	1.4009	0.0078	0.796
	0.951	293.15	1.3643	0.0068	1.24

	0.975	293.15	1.3484	0.0065	1.87
	0.989	293.15	1.3382	0.0062	2.26
	0.992	293.15	1.3357	0.0056	3.07
water	0.205	293.15	1.4927	0.0102	0.164
	0.309	293.15	1.4896	0.0102	0.201
	0.500	293.15	1.4823	0.0098	0.268
	0.704	293.15	1.4656	0.0097	0.387
	0.801	293.15	1.4496	0.0093	0.579
	0.901	293.15	1.4180	0.0082	0.753
	0.950	293.15	1.3860	0.0073	0.835
	0.975	293.15	1.3640	0.0067	0.884
	0.990	293.15	1.3468	0.0063	0.909
	0.995	293.15	1.3406	0.0064	0.917
