Supplementary Information

The dipolarity/polarisability of 1-alkyl-3-methylimidazolium ionic liquids as function of anion structure and the alkyl chain length

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Content

Catalán solvent parameter data and the UV/Vis absorption maxima of dissolved dye **1**

solvent	$\tilde{\nu}_{\max(\mathbf{1})}$ / 10^{-3}cm^{-1} [a)]	*SP* [b)]	*SdP* [b)]	*SA* [b)]	*SB* [b)]
n-hexane	17.67	0.616	0	0	0.056
cyclohexane	17.51	0.683	0	0	0.073
triethylamine	17.33	0.660	0.108	0	0.885
CCl_4	17.21	0.768	0	0	0.104
diethyl ether	17.12	0.617	0.385	0	0.562
p-xylene	17.01	0.778	0.175	0	0.160
toluene	16.95	0.782	0.284	0	0.128
benzene	16.92	0.793	0.270	0	0.124
THF	16.42	0.714	0.634	0	0.591
acetic acid	16.45	0.651	0.676	0.689	0.390
chloroform	16.39	0.783	0.614	0.047	0.071
anisole	16.31	0.820	0.543	0.084	0.299
dichloromethane	16.29	0.761	0.769	0.040	0.178
acetone	16.21	0.651	0.907	0	0.475
1,2-dichloroethane	16.23	0.771	0.742	0.030	0.126
ethanol	16.18	0.633	0.783	0.400	0.658
methanol	16.15	0.608	0.904	0.605	0.545
1-butanol	16.16	0.674	0.655	0.341	0.809
trifluoroethanol	16.08	0.543	0.922	0.893	0.107
1,1,2,2-tetrachloroethane	16.08	0.845	0.792	0	0.017
nitromethane	16.05	0.710	0.954	0.078	0.236
dimethylformamide	15.82	0.759	0.977	0.031	0.613
benzyl alcohol	15.75	0.861	0.788	0.409	0.461
1,2-ethandiol	15.75	0.777	0.910	0.717	0.534
formamide	15.72	0.814	1.006	0.549	0.414
dimethylsulfoxide	15.65	0.830	1.000	0.072	0.647

[a)] S. Spange, R. Sens, Y. Zimmermann, A. Seifert, I. Roth, S. Anders and K. Hofmann, *New J. Chem.*, 2003, **27**, 520.
[b)] J. Catalán, *J. Phys. Chem. B*, 2009, **113**, 5951.

UV/Vis absorption maxima of **2** and **3** in [Rmim] Ionic Liquids with R = *n*-hexyl, *n*-octyl, and *n*-decyl for various anions

Ionic Liquid	$\tilde{\nu}_{max(\mathbf{2})}$ / 10^{-3}cm^{-1}	$\tilde{\nu}_{max(\mathbf{3})}$ / 10^{-3}cm^{-1}
$[C_6mim]Cl$	14.35	16.84
$[C_8mim]Cl$	14.31	16.83
$[C_{10}mim]Cl$	14.29	16.84
$[C_6mim]NO_3$	15.41	17.04
$[C_8mim]NO_3$	15.20	16.95
$[C_{10}mim]NO_3$	15.15	16.95
$[C_6mim]N(CN)_2$	15.77	17.12
$[C_8mim]N(CN)_2$	15.68	17.09
$[C_{10}mim]N(CN)_2$	15.65	17.12
$[C_6mim]BF_4$	16.18	17.12
$[C_8mim]BF_4$	16.05	17.15
$[C_{10}mim]BF_4$	15.95	17.18
$[C_6mim]PF_6$	16.72	17.27
$[C_8mim]PF_6$	16.56	17.30
$[C_{10}mim]PF_6$	16.47	17.21
$[C_6mim]CF_3SO_3$	16.16	17.18
$[C_8mim]CF_3SO_3$	16.00	17.21
$[C_{10}mim]CF_3SO_3$	15.97	17.21
$[C_6mim]Ntf_2$	16.98	17.27
$[C_8mim]Ntf_2$	16.84	17.21
$[C_{10}mim]Ntf_2$	16.75	17.21

Results of the correlation of the determined π^* values with the product of α with β for [Rmim] Ionic Liquids with 6 various anions

Anions: Cl^-, NO_3^-, $N(CN)_2^-$, BF_4^-, PF_6^-, Ntf_2^-

General formula: $\pi^* = A + B(\alpha \times \beta)$

Cation	*A*	*B*	r^2	*sd*	*n*	*F*
[Bmim]	0.12	3.14	0.85	0.05	6	0.0093
$[C_6mim]$	0.42	2.00	0.88	0.03	6	0.0050
$[C_8mim]$	0.44	1.80	0.79	0.03	6	0.0167
$[C_{10}mim]$	0.57	1.22	0.64	0.03	6	0.0560

r^2 = correlation coefficient; *sd* = standard deviation; *n* = number of solvents; *F* = significance.