Electronic Supplementary Information

Photoresponsive ionic liquid crystals assembled via halogen bond: en route towards light-controllable ion transporters

Marco Saccone,[a] Francisco Fernandez Palacio, [b] Gabriella Cavallo,[b*] Valentina Dichiarante,[b] Matti Virkki,[a] Giancarlo Terraneo,[b] Arri Priimagi,[a] and Pierangelo Metrangolo[b,c]

[a]Laboratory of Chemistry and Bioengineering, Tampere University of Technology, P.O. Box 541, FI-33101 Tampere, Finland. [b]Supramolecular & BioNano Materials Laboratory (SupraBioNanoLab) Department of Chemistry, Materials, and Chemical Engineering "Giulio Natta", Politecnico di Milano, Via L. Mancinelli 7, 20131 Milano, Italy. [c]HYBER Centre of Excellence, Department of Applied Physics, Aalto University, P.O. Box 15100, FI-02150, Espoo, Finland.

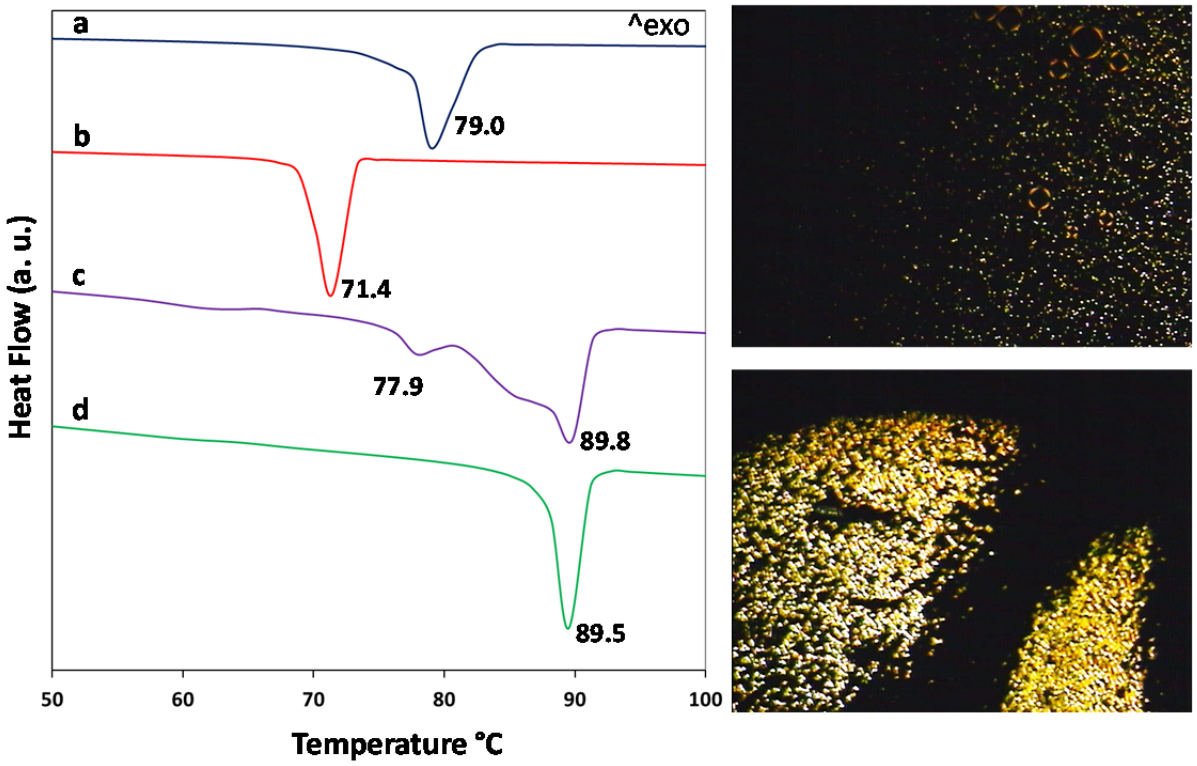

Figure 1: **Left**: DSC thermographs upon the first heating cycle at 10 °C min-1 of: **a**) 1-Et-3-Me-imidazolium iodide (**1**); **b**) $\mathbf{AZO_{OC10}}$; **c**) Complex $\mathbf{1/AZO_{OC10}}$ (1:1 ratio); d) Complex $\mathbf{1{\cdot}AZO_{OC10}}$ (1:2 ratio). Peak maximum temperatures of each peak are indicated in the graph. **Right**: Optical textures of the smectic A phase observed on cooling from the isotropic state for complex $\mathbf{1{\cdot}AZO_{OC10}}$ (top; T = 79,2°C; bottom; T = 75,1°C).

Table S1. Experimental details for **3·AZO$_{OC12}$** and **2·AZO$_{NC1}$**

Compound	**3·AZO$_{OC12}$**	**2·AZO$_{NC1}$**
Chemical Formula	$2(C_{24}H_{29}F_4IN_2O)\cdot(C_{16}H_{31}N_2)^+\cdot(I)^-$	$2(C_{14}H_{10}F_4IN_3)\cdot(C_{12}H_{23}N_2)^+\cdot(I)^-$
Formula weight	1507.11	1168.52
CCDC number		
Temperature (K)	103	103
Crystal system	Triclinic	Monoclinic
Space group	*P-1*	$P2_1$
a (Å)	14.9747(15)	10.406(2)
b (Å)	18.898(2)	7.8092(14)
c (Å)	25.034(3)	26.717(5)
α (°)	87.618(12)	90
β (°)	76.317(10)	92.90(2)
γ (°)	76.576(10)	90
Volume (Å^3)	6694.6(13)	2168.3(7)
Z	4	2
Crystal size (mm^3)	0.22 x 0.21 x0.10	0.27 x 0.17 x 0.09
μ (mm^{-1})	1.47	2.24
T_{min}, T_{max}	0.607, 0.695	0.632, 0.747
No. of measured, independent and observed [$I > 2\sigma(I)$] reflections	208179, 42910, 27374	89689, 18631, 17551
R_{int}	0.039	0.024
$(\sin\theta/\lambda)_{max}$ (Å^{-1})	0.737	0.827
$R[F^2 > 2\sigma(F^2)]$, $wR(F^2)$, S	0.037, 0.090, 1.02	0.02, 0.045, 1.02
No. of reflections	42910	18631
No. of parameters, No. of restraints	1503, -	536, 1
$\Delta\rho_{min}$, $\Delta\rho_{max}$ (e Å^{-3})	-0.88, 3.56	-0.43, 1.25

Computer programs: Bruker APEX2, Bruker SAINT, SHELXS (Sheldrick, G. M. (2008). Acta Cryst. A64, 112-122), SHELXL (Sheldrick, G. M. (2015). Acta Cryst. A64, 112-122), Mercury (Macrae, C. F., Edgington, P. R., McCabe, P., Pidcock, E., Shields, G. P., Taylor, R., Towler, M. & van de Streek, J. (2006). J. Appl. Cryst. 39, 453-457