Supplementary Information

Preparation and Characterization of Transparent Polymeric Electrolyte Containing Ionic Liquid with Long Alkyl Chains for Electroactive Polymers

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1. Performance comparison of iEAPs containing IL

We found that water plays a major role in the actuation performance of the PVA/IL-based iEAPs. For the dehydrated iEAP samples, no obvious deformation was observed (except for PL5-5), due to the constraints of the high viscosity, the large molecular size of C_{10}MIMCl, and a small actuation voltage (2V). The deformation comparison of IL contained iEAPs is summarized in Table S1. The structures of materials in Table S1 are shown in Figure S1.

Table S1. Performance comparison of typical IL-containing iEAPs

Electrolyte composition	Mobile ion	Bending direction	Actuation voltage (V)	Average curvature (m^{-1})	Reference
PVDF/ $C_{10}MIMCl$	$C_{10}MIM^+$ & Cl^-	anode	10	~1.00	[1]
Nafion/ C_4MIMCl	C_4MIM^+	anode	4	~5.06	[2]
Nafion/ C_2MIMTf	C_2MIM^+	anode	2.5	3.82	[3]
BC/C_2MIMBF_4	C_2MIM^+	anode	1	~6.60	[4]
BC/ C_2MIMBF_4/MWCNT	C_2MIM^+	anode	1	~12.50	[4]
			1.5	16.47	
Cellulose/ C_4MIMCl	Cl^-	cathode	2	~4.42	[5]
			5	~24.95	
Nafion/LiCl/ C_2MIMBF_4	Li^+& C_2MIM^+	anode	2	~15.13	[6]
Nafion/ C_2MIMBF_4	C_2MIM^+			~2.66	
Nafion/ C_2MIMBF_4	C_2MIM^+	anode	2	~2.15	[7]
Nafion/ C_4MIMCl	C_2MIM^+	anode	2	~2.44	[8]
			5	~9.89	
CBC/ C_2MIMBF_4/MWCNT	C_2MIM^+ & BF_4^-	anode	1	12.05	[9]
MFC/ C_2MIMBF_4	C_2MIM^+ & BF_4^-	anode	2	12.40	[10]
CA/ C_4MIMBF_4/GN	C_4MIM^+ & BF_4^-	anode	3	14.18	[11]
PL5-5-0	Cl^-	cathode	2	5.17	this work
PL5-5-19.80				40.53	

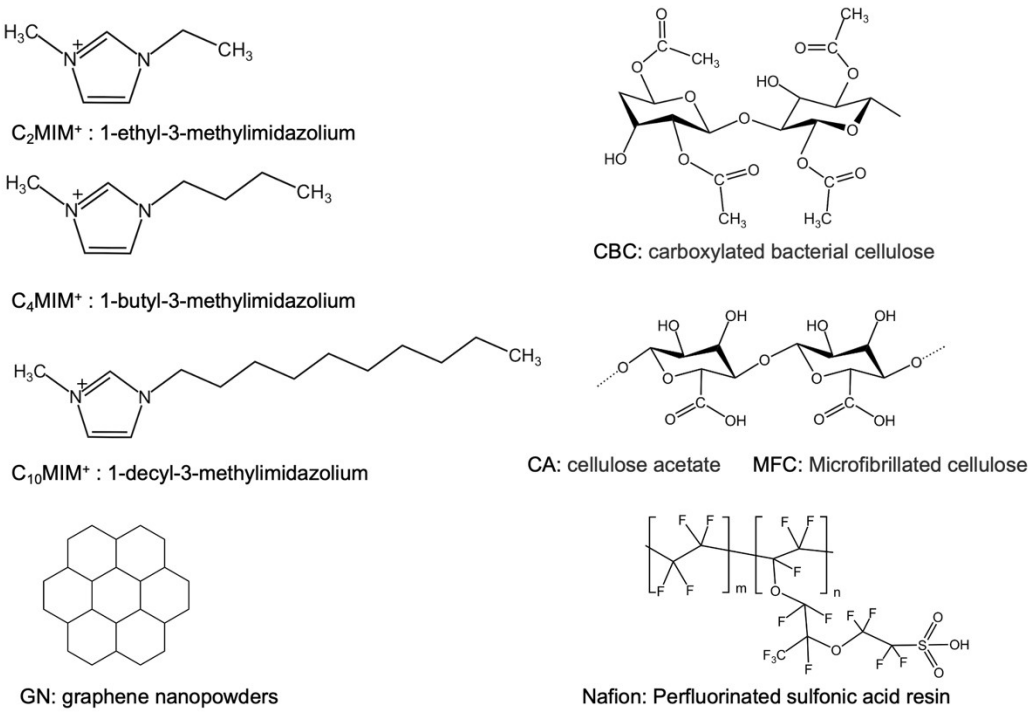

Figure S1. Structures of IL cations, filler, and polymer matrix

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