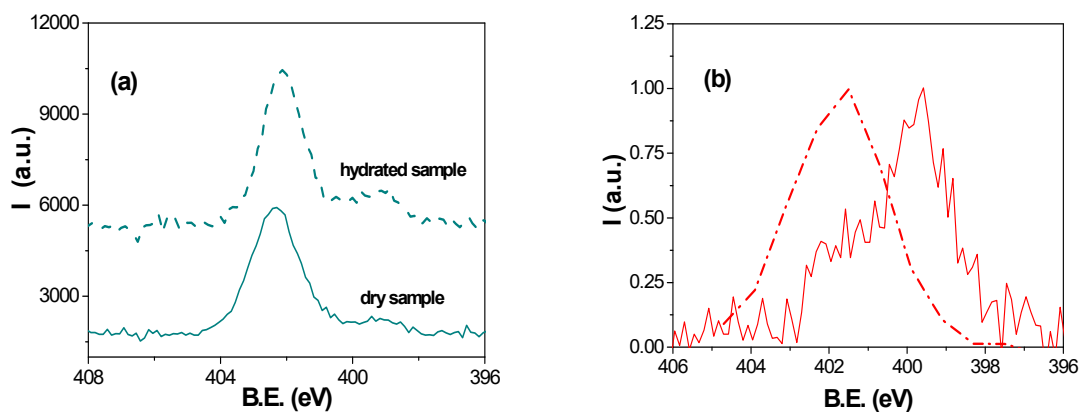
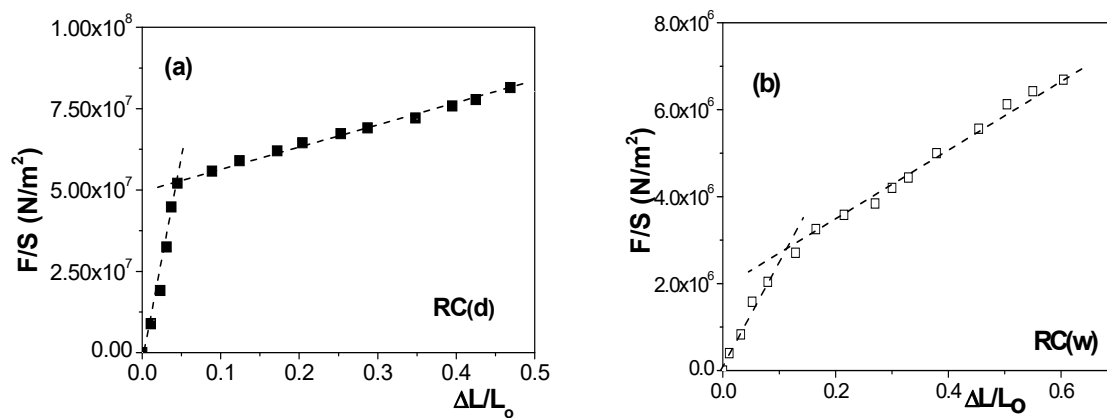


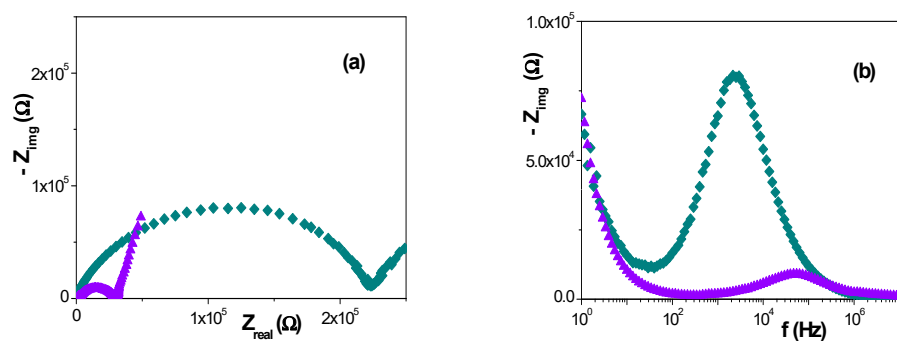
**Figure S1.** Chemical formula of: (a) AliquatCl IL, (b) BMIMPF<sub>6</sub>, and (c) regenerated cellulose.



**Figure S2.** (a) Comparison of N 1s core level signal determined for a 40%CTA+60%AliquaCl sample in dry (blue solid line) and hydrated (blue dashed line) states. (b) Comparison of normalized N 1s core level signal for the RC/BMIMPF<sub>6</sub> film (red solid line) and BMIMPF<sub>6</sub> IL (red dashed line).



**Figure S3.** Stain vs stress curves measured with: (a) a dry RC film, (b) a wet RC film (after 72 h in distilled water).



**Figure S4.** Impedance plots for two CTA/AliquatCl membranes with different AliquatCl content: 30 % AliquatCl and 70 % CTA (♦), 60 % AliquatCl and 40 % CTA (▲). (a) Nyquist plot, (b) Bode plot.  $f_{\max}$  for the 30 % AliquatCl and 70 % CTA sample: 2580 Hz;  $f_{\max}$  for the 60 % AliquatCl and 40 % CTA sample: 80000 Hz.

**Table S1.** Atomic concentration percentages of the elements detected on the surfaces\* of the BMIMPF<sub>6</sub> and AliquatCl ILs and the RC-support film.

Sample	C (%)	N (%)	F (%)	P (%)	Cl (%)	O (%)	Si (%)
BMIMPF <sub>6</sub> IL	49.0	10.6	33.2	6.4		0.8	
AliquatCl IL	93.2	3.5			3.3		
RC film	62.1	0.3				35.2	2.2

\* measurements performed at 45° take off angle.