

Supporting Information

Protic poly(diallylmethylammonium) poly(ionic liquid)s proton exchange membranes with low fluorine content

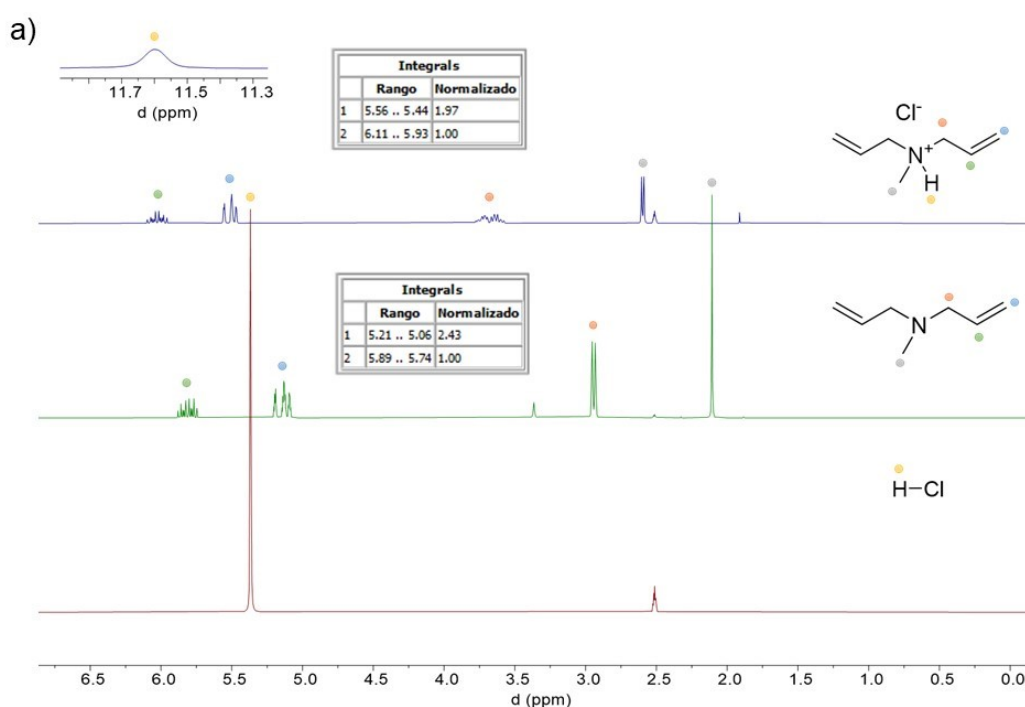
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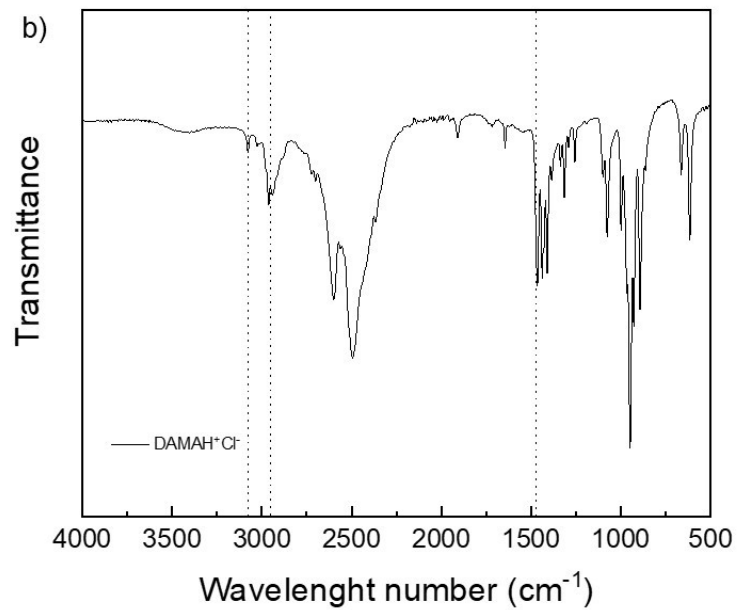


Figure S1. (a) ¹H NMR spectra comparison between DAMA, HCl and the protic DAMAH⁺Cl⁻ monomer (b) FTIR spectra of DAMAH⁺Cl⁻.

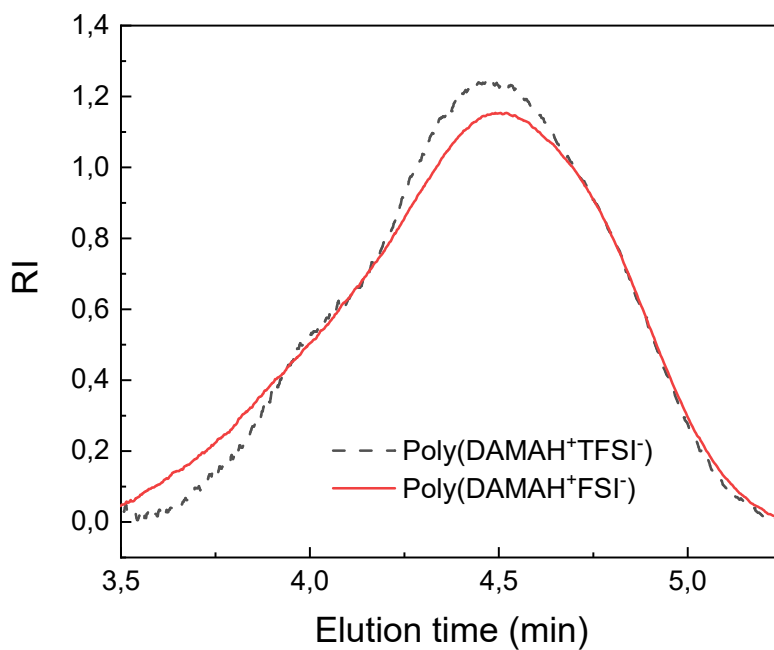


Figure S2. SEC result of both poly(DAMAH⁺TFSI⁻) and poly(DAMAH⁺FSI⁻) carried out in THF.

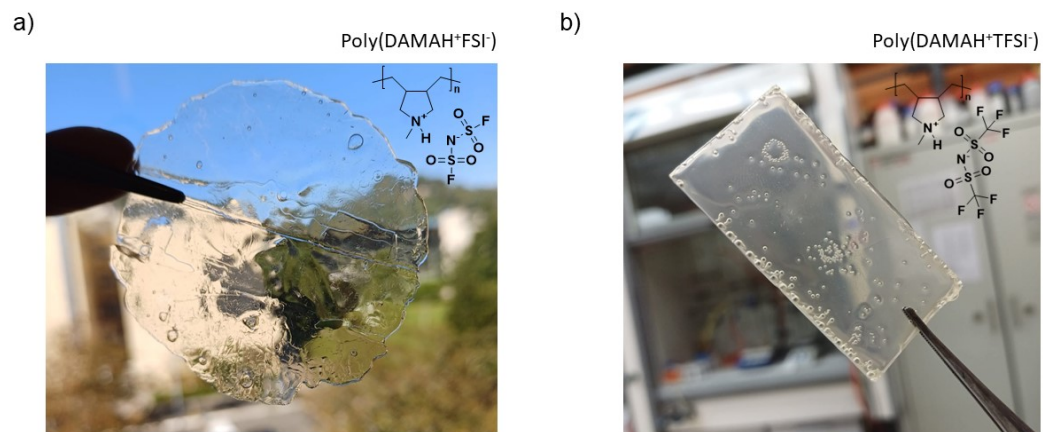


Figure S3. Protic membrane pictures of poly(DAMAH⁺FSI⁻) (a) and poly(DAMAH⁺TFSI⁻) (b).

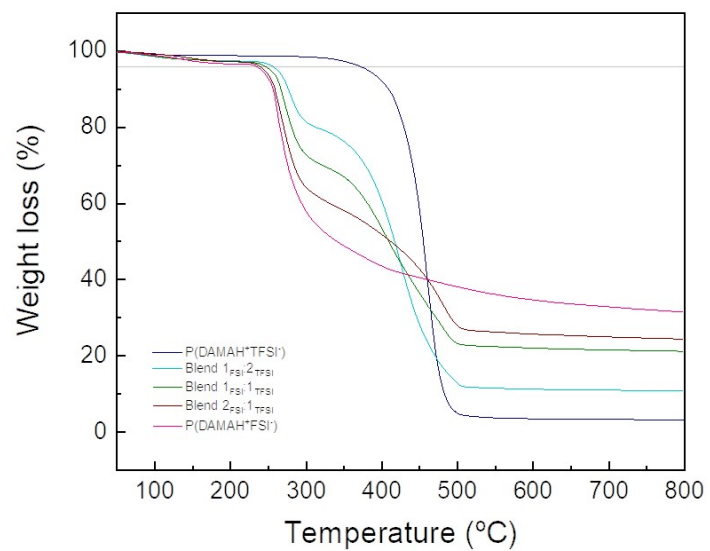


Figure S4. TGA results for all protic membranes.

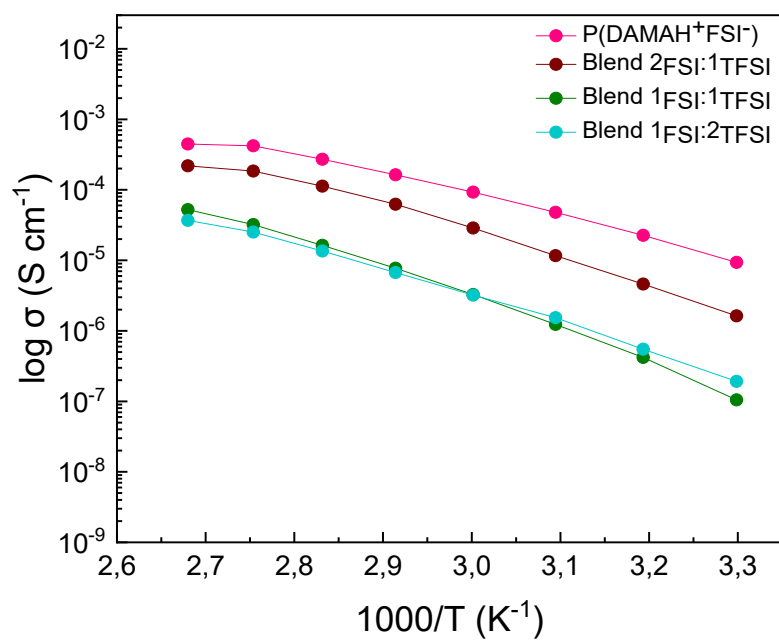


Figure S5. Ionic conductivity measurements by electrochemical impedance spectroscopy (EIS) at dry state from 30 to 100 °C of all protic membranes.

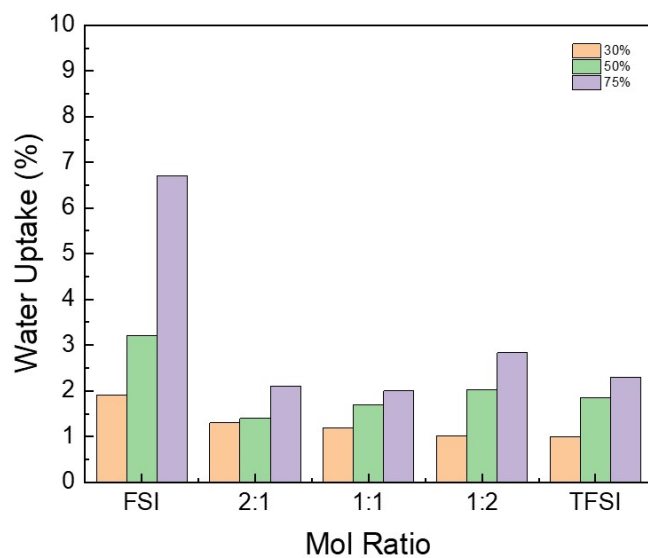


Figure S6. Water uptake (%) versus mol ratio between poly(DAMAH⁺TFSI⁻) and poly(DAMAH⁺FSI⁻) for all protic membranes at room temperature and 30, 50 and 75 RH%.

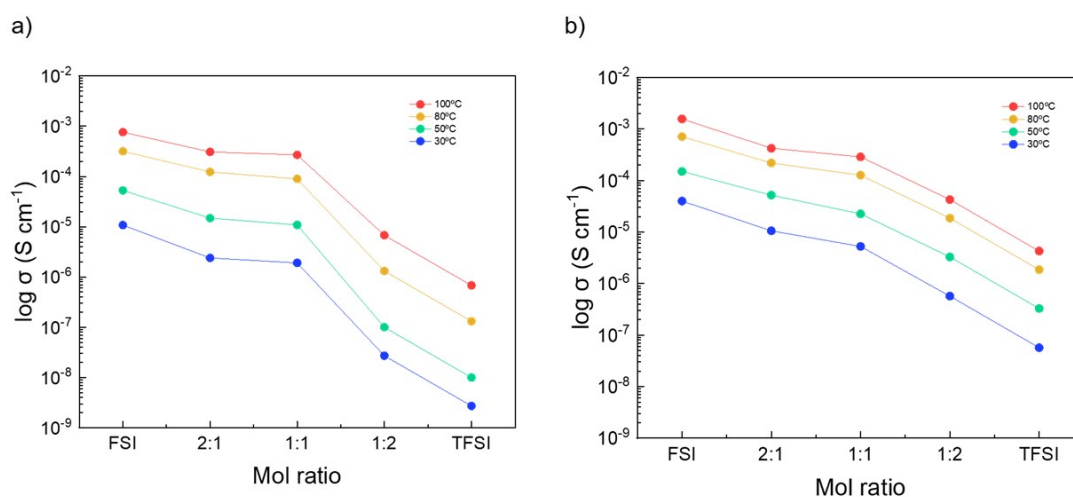


Figure S7. Ionic conductivity measurements by electrochemical impedance spectroscopy (EIS) under 30 (a) and 50% (b) RH at 30, 50, 80 and 100 °C of all protic membranes.

Polymer	E_a (J/mol) (dry)	E_a (J/mol) RH 75%
Poly(DAMAH ⁺ FSI ⁻)	53	39
Blend 2 _{FSI} :1 _{TFSI}	68	45
Blend 1 _{FSI} :1 _{TFSI}	83	50
Blend 1 _{FSI} :2 _{TFSI}	71	49
Poly(DAMAH ⁺ TFSI ⁻)		40

Table S1. Activation energy (E_a) data for the protic membranes at dry and 75% RH states.