Supplementary Information

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Use of Solid-State NMR Spectroscopy for the Characterization of Molecular Structure and Dynamics in Solid Polymer and Hybrid Electrolytes

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One of the objectives of this article is to provide a comprehensive introduction to solid-state NMR spectroscopy for the analysis of polymer and hybrid electrolytes. Therefore, a table describing the necessary equipment to perform each experiment and the approximate time required is provided here (Table S1). NMR experimental techniques are listed in the order that they appear in the main text.

Table S1: Requirements for the analysis of solid polymer and hybrid electrolytes using the NMR spectroscopy experiments that are presented in the text

NMR Experimental Technique	Required Equipment	Pulse Sequence	Experimental Time
PFG NMR	-High field magnet -Multiple resonance gradient probe or MAS probe -NMR tube or rotor -Variable temperature capabilities (heater, chiller, heat exchanger)	Stimulated echo	Several Minutes
Electrophoretic NMR	- High field magnet - Multiple resonance gradient probe - Variable temperature capabilities (heater, chiller, heat exchanger) - Specialized sample holder to supress convectional flow	Electrophoretic	Several Minutes
T_1 Relaxation	-High field magnet -Magic angle spinning probe -Rotor -Variable temperature capabilities (heater, chiller, heat exchanger)	Inversion recovery	Minutes to hours depending on estimated T_1 relaxation time
T_2 Relaxation	-High field magnet -Magic angle spinning probe -Rotor	Carr-Purcell-Meilboom-Gill	Several minutes

	-Variable temperature capabilities (heater, chiller, heat exchanger)		
Linewidth Analysis	-High field magnet -Magic angle spinning probe -Rotor -Variable temperature capabilities (heater, chiller, heat exchanger)	Various1D experiments	Seconds to minutes depending on T_1 relaxation time
Exchange Spectrosocpy	-High field magnet -Magic angle spinning probe -Rotor -Variable temperature capabilities (heater, chiller, heat exchanger)	EXSY	Several hours
Cross Polarization	-High field magnet -Multi-resonance magic angle spinning probe -Rotor -Variable temperature capabilities (heater, chiller, heat exchanger)	Cross polarization	Seconds to minutes depending on T_1 relaxation time
REDOR	-High field magnet -Magic angle spinning probe -Rotor -Variable temperature capabilities (heater, chiller, heat exchanger)	REDOR	Several minutes