Supplementary Information (SI) for Energy Advances.

Supporting Information

Aqueous Lithium Polyacrylic Acid Binder Enables Sulfur Distribution and High Active Material-Loading to Enhance Li-S Battery Performance

Dharmapura H. K. Murthy, Pranjalee Ghosh, Syeda Reha Khadri and Manu U. M. Patel*

Department of Chemistry, Manipal Institute of Technology, Manipal Academy of Higher Education, Manipal, Karnataka, India.

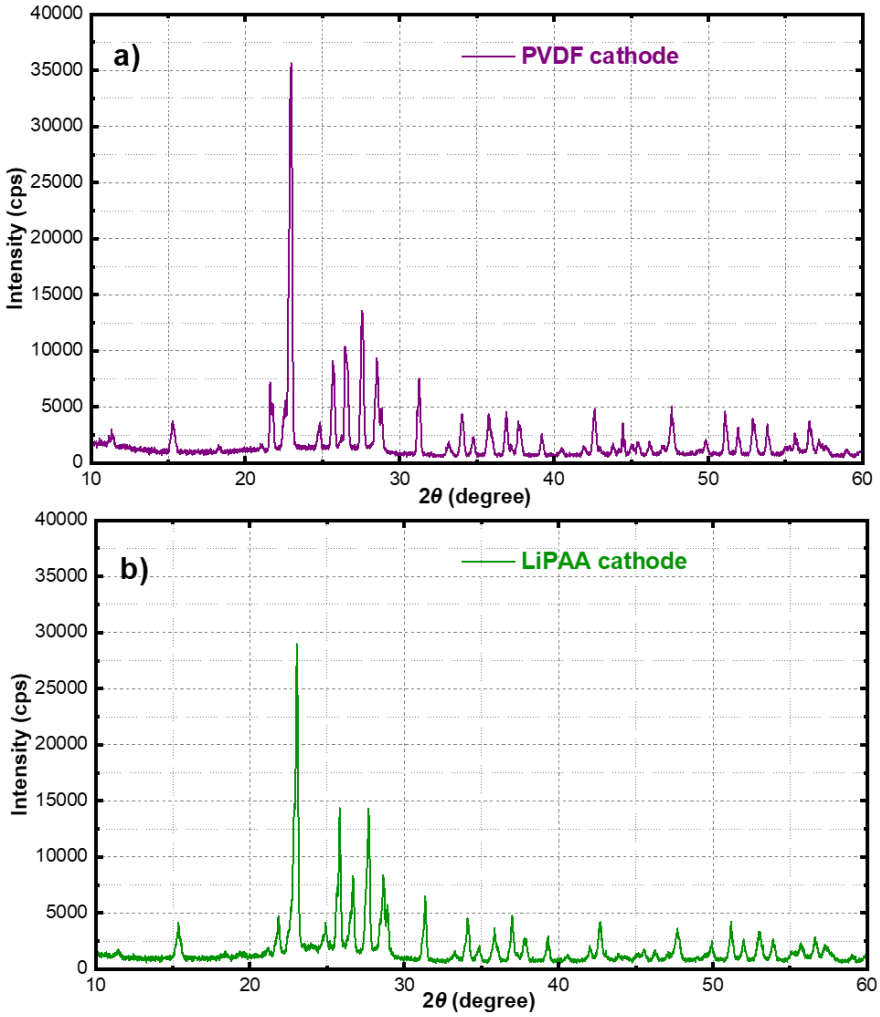
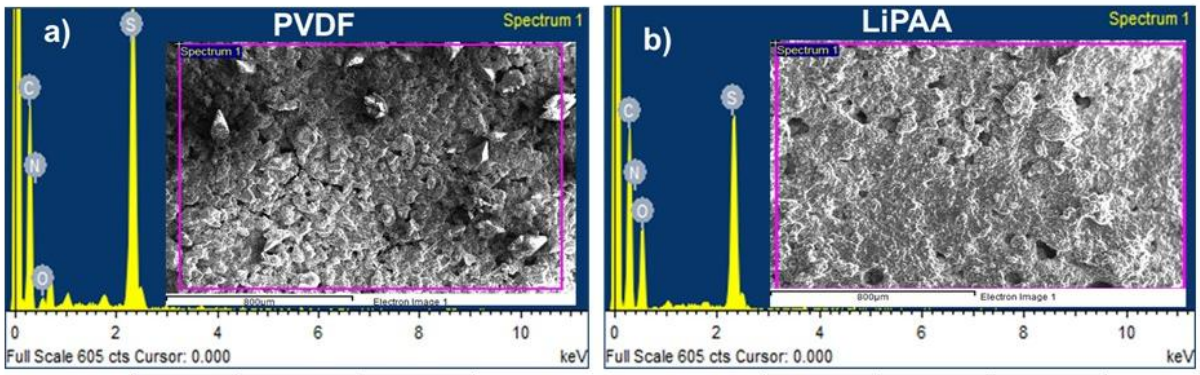


Fig. S1. XRD were measured at a scan rate of 5 degree/min. XRD patterns collected from PVDF- and LiPAA-based electrodes match with characteristic diffraction peaks of crystalline S_8 (JCPDS no. 08-0247). a) The XRD pattern of the PVDF-based cathode exhibits higher-intensity diffraction peaks at $2\theta \approx 21.5°$, 22.5°, 27.5°, and 31.0° compared with the b) LiPAA-based cathode, indicating more pronounced crystalline contributions in the PVDF-containing electrode.



Element	Weight%	Atomic%
C K	72.65	84.50
N K	2.70	2.69
O K	4.73	4.13
S K	19.92	8.68
Total	100.00	

Element	Weight%	Atomic%
C K	59.18	69.91
N K	1.28	1.30
O K	25.44	22.56
S K	14.10	6.24
Total	100.00	

Fig. S2. Elemental distribution data from EDX measurements for a) PVDF- and b) LiPAA-based cathode shows higher percentage of surface S_8 for the former electrode. EDX measurements are done at three different spots on the electrode, and an average of 5% difference was observed between the PVDF- and LiPAA-based electrodes.

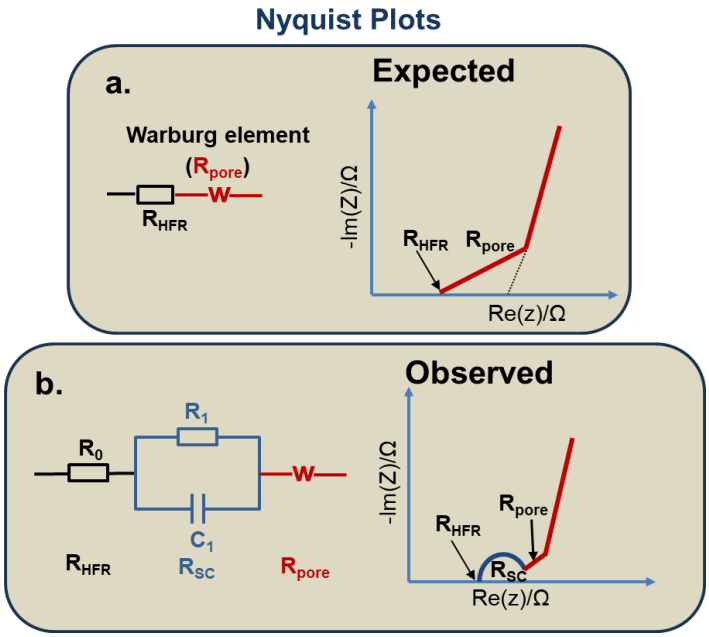


Fig. S3. a) Expected Nyquist plot and respective electrical circuit from the symmetrical cells with non-intercalating electrolyte. b) Observed Nyquist plot and its equivalent electrical circuit.

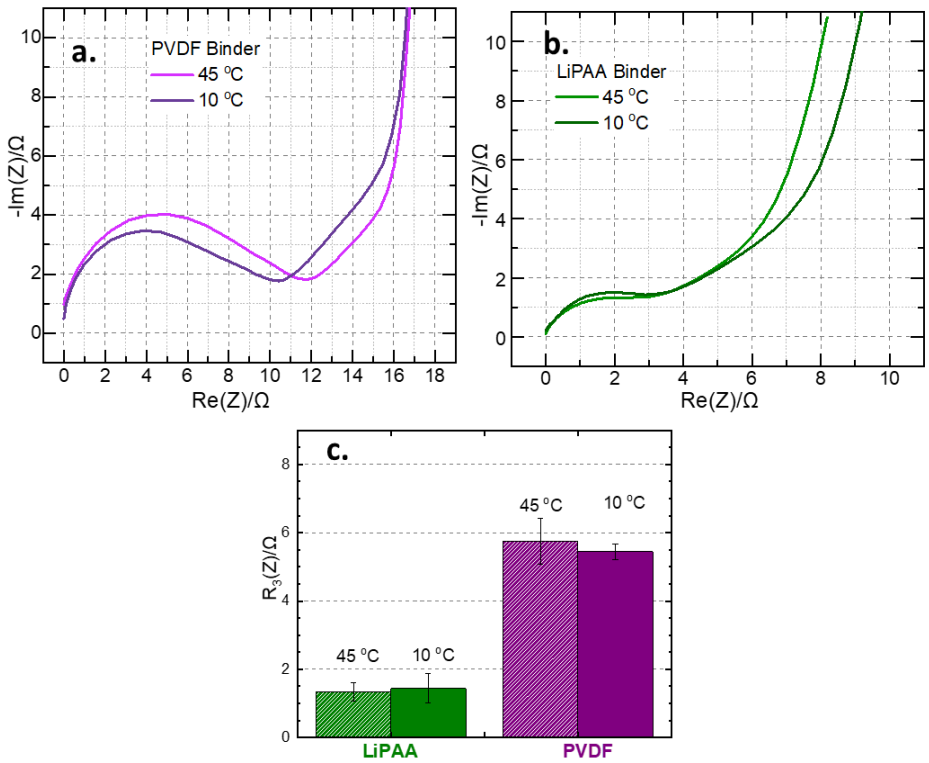


Fig. S4. a,b) Nyquist plots from PVDF, LiPAA-based electrodes at 10 and 45 ºC. c) Shows the total resistance from PVDF, LiPAA based electrodes at 10 and 45 ºC.