

Supplementary Materials: Polyacrylonitrile-Derived Carbon Nanocoating for Long-Life High-Power Phosphate Electrodes

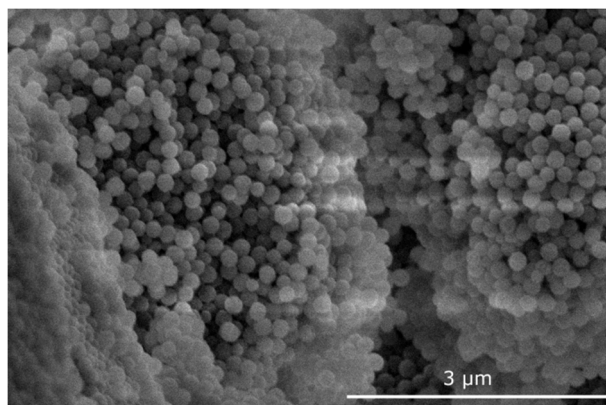


Figure S1. SEM image of PAN particles.

Table S1. Mass ratio for producing Li-rich LFMP/C composites.

Sample ID	Mass of Li-rich LFMP, g	Mass of Precursor, mg	Expected Carbon Content, %
PAN-2	1	30.0	2
PAN-4		61.3	4
PAN-8		127.8	8
Glu		104.2	4

The carbon content was estimated by the following equation: $M = \frac{1+x}{1-y}$ where M – is the total mass change of the bare sample, which includes oxidation of the LFMP on air at 900°C, x – carbon content, y – total mass change of LFMP/C composites resulting from LFMP oxidation and carbon burning at 900°C. The experimental TG curves uncoated LFMP is depicted in Figure S2. The overlapping of d-metals and carbon oxidation makes it impossible to precisely extract the correct values of carbon content. In that sense it is necessary for d-metals oxidation process to be complete which could be deduced by the appearance of plateau at TG curves.

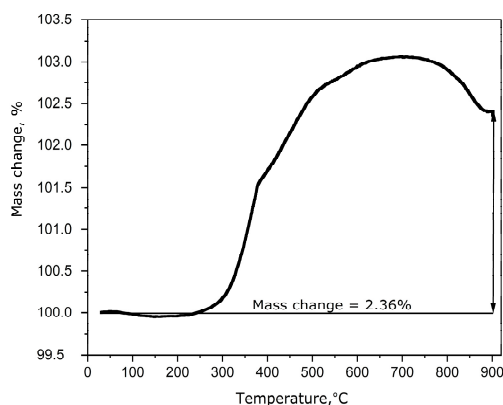


Figure S2. Experimental TG curve for pristine Li-rich LFMP.

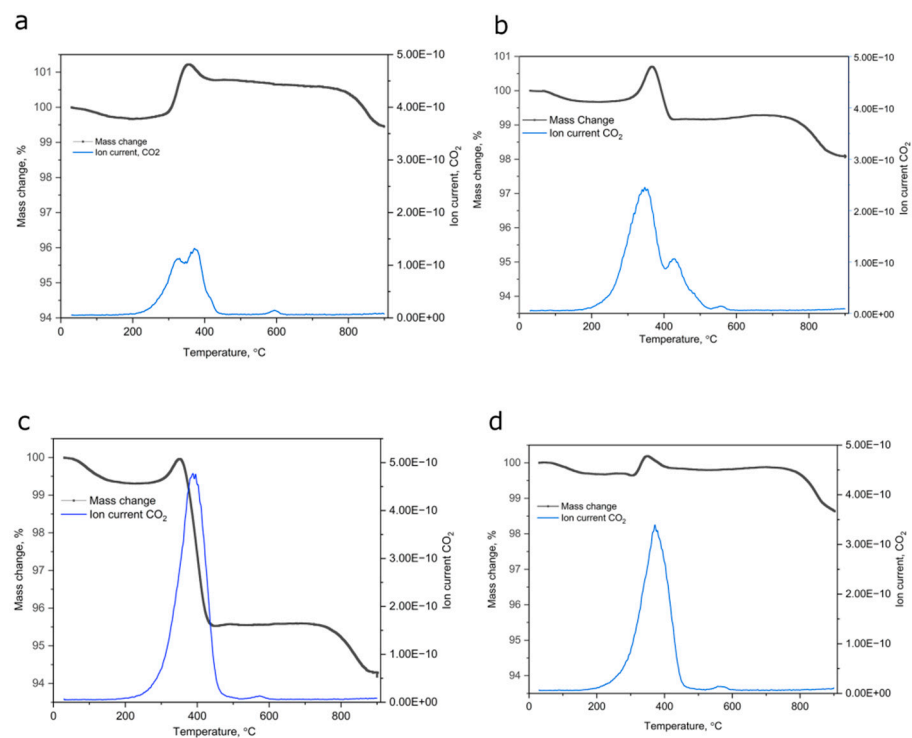


Figure S3. Experimental TG curve for PAN-2 (a), PAN-4 (b), PAN-8 (c) and Glu (d).

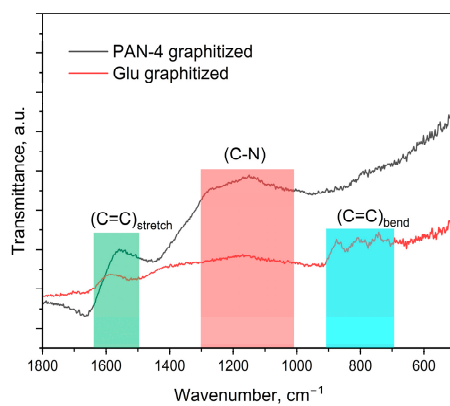


Figure S4. Organic functional groups presenting in graphitized PAN and Glu after 650 °C.

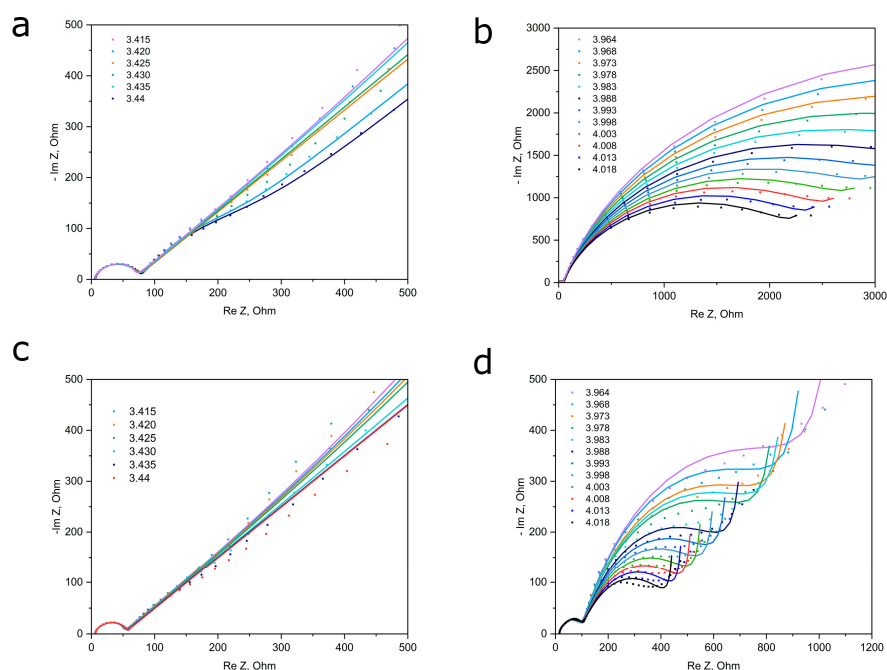


Figure S5. Impedance spectra of LFMP/C in the single-phase regions of Fe redox for Glu (a) and PAN-4 (b) and Mn redox for Glu (c) and PAN-4 (d). Symbols are experimental data, lines represent the fitted impedance spectra.

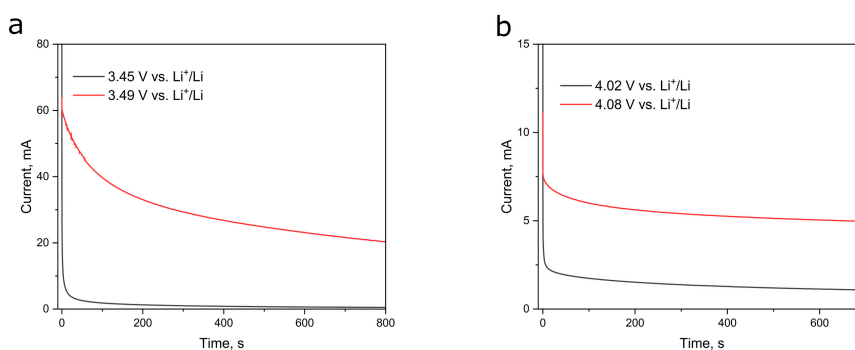


Figure S6. Current transients of PAN-4 sample assigned to the diffusion and two-phase transients before and after the phase transition of Fe (a) and Mn (b).

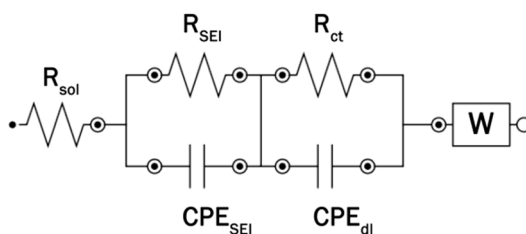


Figure S7. Equivalent circuit model for impedance data treatment, where R_{sol} represents the resistivity of electrolyte, R_{SEI} and CPE_{SEI} are resistivity and capacitance of SEI layer, R_{ct} and CPE_{dl} – charge transfer resistance and double layer capacitance, W – Warburg element.