Supporting Information

Performance evaluation of $LiFePO_4OH$ cathode for stationary storage applications using a reduced order electrochemical model

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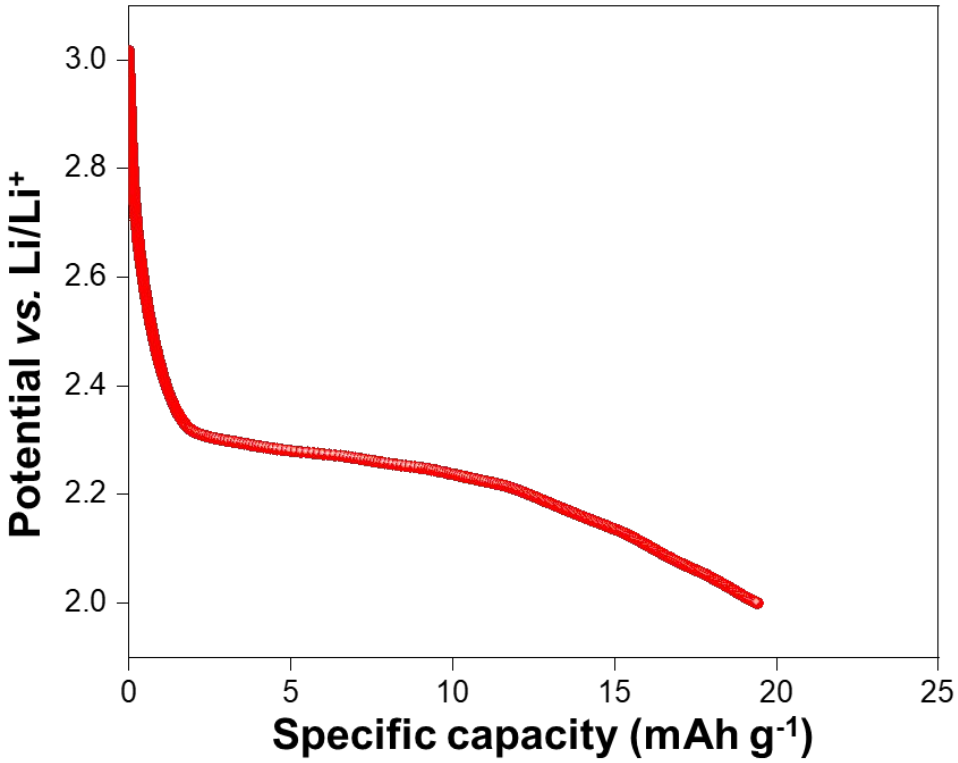

Figure S1. First discharge profile of pristine $LiFePO_4OH$ material (without any modification) obtained when discharged upto 2.0 V vs. Li^+/Li at C/20 rate at room temperature.

Parameters	Anode	Separator	Cathode
	NG		$LiFePO_4OH$
$Thickness\ (\mu m)$	30	10	30
$Solid\ fraction, \varepsilon_s$	0.35		0.32
$Liquid\ fraction, \varepsilon_l$	0.601	0.43	0.621
$Particle\ radius, r_p\ (\mu m)$	5×10^{-6} [1]		0.7×10^{-6}
$c_{s.max}\left(\frac{mol}{m^3}\right)$	28600		18375
$D_s\left(\frac{m^2}{s}\right)$	1.4523×10^{-13} [1]		$PITT\ data$
$k_r\left(\frac{m}{s}\right)$	3.11×10^{-11} [1]		2.00×10^{-11}
SOC_{min}	0.05		0.35
SOC_{max}	0.90		0.995
$c_e\left(\frac{mol}{m^3}\right)$	1150	1150	1150

Table S1. List of parameters used in the simulations.

Table S2. Operating conditions used in the simulations.

Charge and Discharge windows	Value
$CC\ charge\ cut\ off\ voltage, V_{max}$	4 V
$CC\ discharge\ cut\ off\ voltage, V_{min}$	1.5 V

Reference

(1) Bharathraj, S.; Adiga, S. P.; Patil, R. S.; Mayya, K. S.; Song, T.; Sung Y. An efficient and chemistry independent analysis to quantify resistive and capacitive loss contributions to battery degradation. *Sci. Rep.* **2019**, *9*, 6576:1-10.

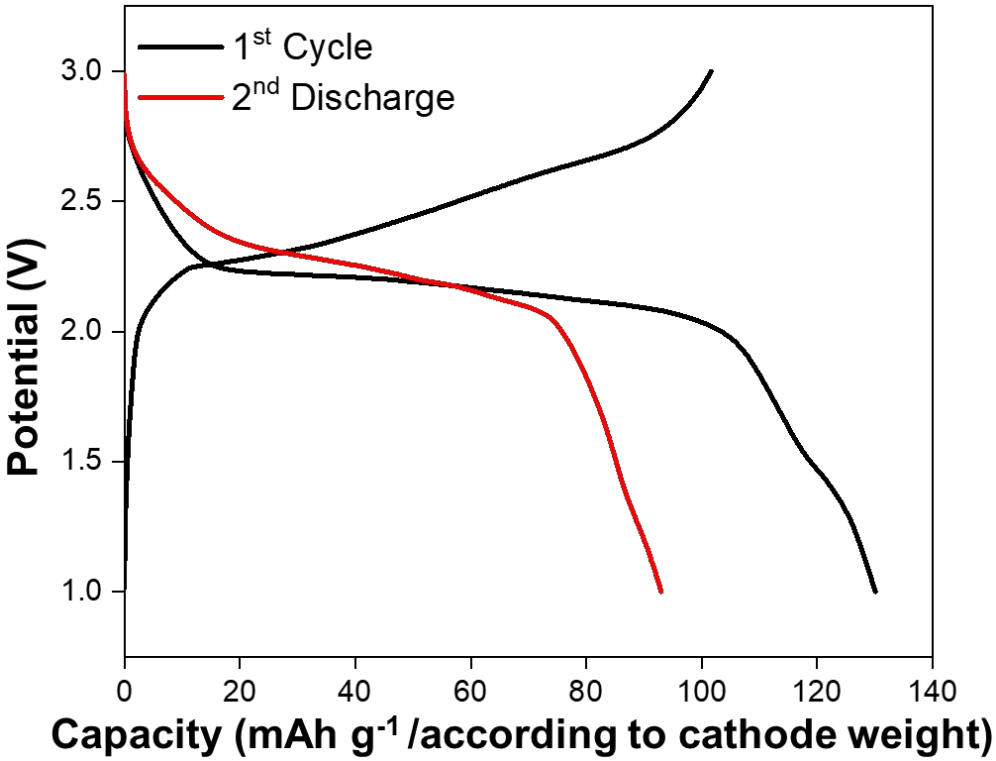

Figure S2. Initial two discharge cycles of a full-cell assembled using $LiFePO_4OH$ cathode and lithiated graphite cycled at C/20 rate at room temperature.