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Supporting Information

Towards Enhanced Sodium Storage by Investigation on Li Ions Doping and Rearrangement Mechanism in $Na_3V_2(PO_4)_3$ for Sodium Ion Batteries

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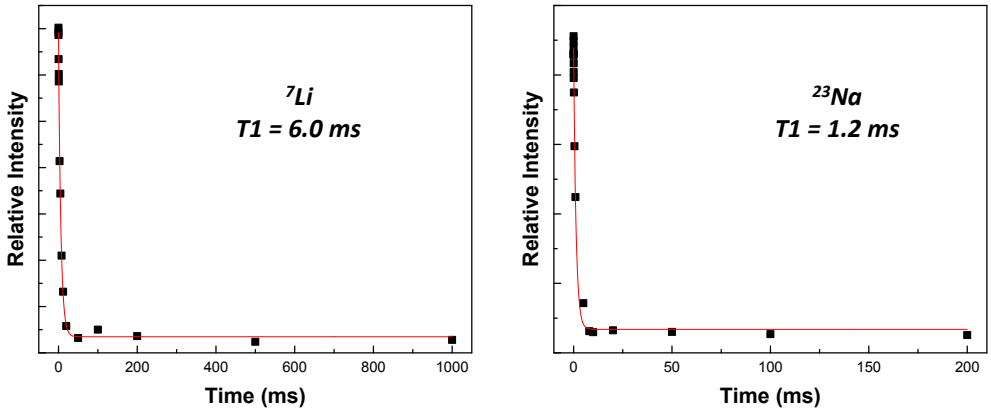

Figure S1. Plot of the longitudinal relaxation time (T1) measurements for ^{7}Li in $Li_3V_2(PO_4)_3$ and ^{23}Na in $Na_3V_2(PO_4)_3$.

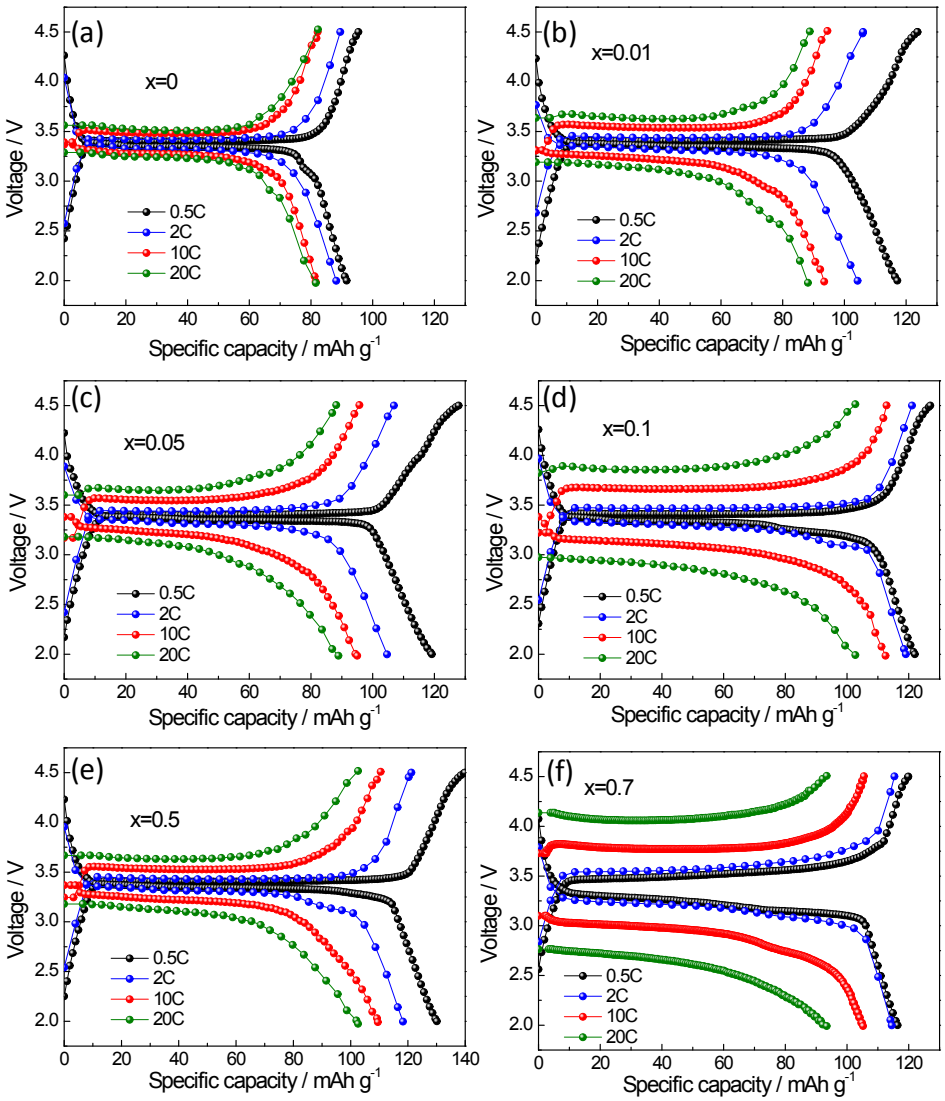

Figure S2. Charge-discharge profiles at different rates (0.5C, 2C, 10C and 20C) for the $Na_{3-x}Li_xV_2(PO_4)_3$/C samples (a) x = 0, (b) x = 0.01, (c) x = 0.05, (d) x = 0.1, (e) x = 0.5 and (f) x = 0.7.

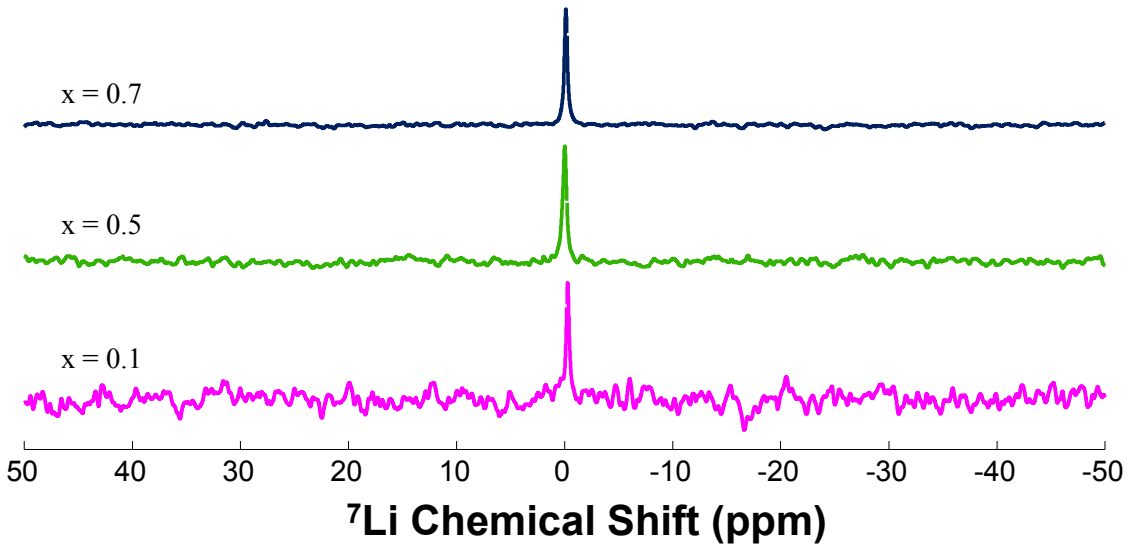

Figure S3. ^{7}Li liquid NMR spectra of the electrolyte solvent after immersing $Na_{3-x}Li_xV_2(PO_4)_3$ cathode materials.

Table S1. Theoretical weight ratio and ICP results for the elements in the $Na_{3-x}Li_xV_2(PO_4)_3$/C (x = 0, 0.01, 0.05, 0.1, 0.5 and 0.7) samples.

	Na	Li	P	V	C
Samples	Thr./Exp.(%)	Thr./ Exp.(%)	Thr./ Exp.(%)	Thr./ Exp.(%)	Exp.(%)
x = 0	13.80/13.80	0.00/0.00	18.60/18.11	20.35/19.09	8.84
x = 0.01	13.70/13.65	0.01/0.01	18.53/17.64	20.28/18.41	9.22
x = 0.05	13.62/13.60	0.07/0.05	18.67/17.78	20.42/19.73	8.69
x = 0.1	13.45/13.13	0.14/0.09	18.75/17.43	20.51/18.96	8.45
x = 0.5	11.65/11.51	0.71/0.68	18.84/18.10	20.61/19.74	9.31
x = 0.7	10.85/10.94	1.00/0.93	19.07/18.20	20.87/19.14	8.82

Table S2. Relative integral of Na2 and Na1 sites in the ^{23}Na ssNMR spectra of $Na_{3-x}Li_xV_2(PO_4)_3$ samples.

	Relative Intensity					
	$x = 0$	$x = 0.01$	$x = 0.05$	$x = 0.1$	$x = 0.5$	$x = 0.7$
Na2(M2)	0.66	0.65	0.63	0.53	0.58	0.71
Na1(M1)	0.34	0.35	0.37	0.47	0.42	0.29
Ratio (Na2: Na1)	1.94	1.86	1.70	1.13	1.38	2.45

Table S3. Ions occupancy in the $Na_3V_2(PO_4)_3$, $Na_{2.9}Li_{0.1}V_2(PO_4)_3$, $Na_{2.5}Li_{0.5}V_2(PO_4)_3$ and $Na_{2.3}Li_{0.7}V_2(PO_4)_3$ samples.

Samples	Na1	Na2	V	P	O1	O2	Ratio (Na2/Na1)
$x = 0$	0.7894	0.7466	1	1	1	1	1.8916
$x = 0.1$	0.7959	0.7401	1	1	1	1	1.8598
$x = 0.5$	0.7408	0.7952	1	1	1	1	2.1469
$x = 0.7$	0.6969	0.8391	1	1	1	1	2.4081