Supporting information

P-doping boosting electronic properties and ionic kinetics of MnV_2O_6 for high-performance lithium-ion batteries

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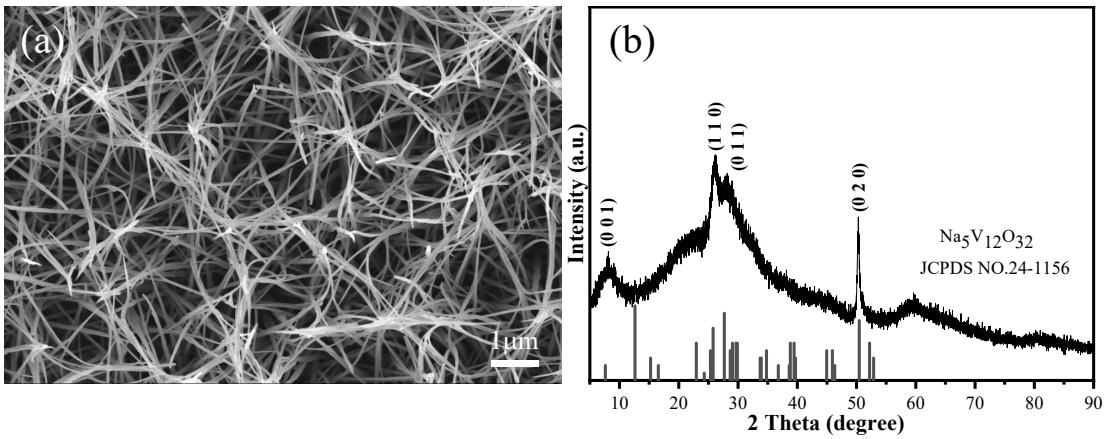

Figure S1 (a) The SEM image and (b) XRD pattern of the $Na_5V_{12}O_{32}$.

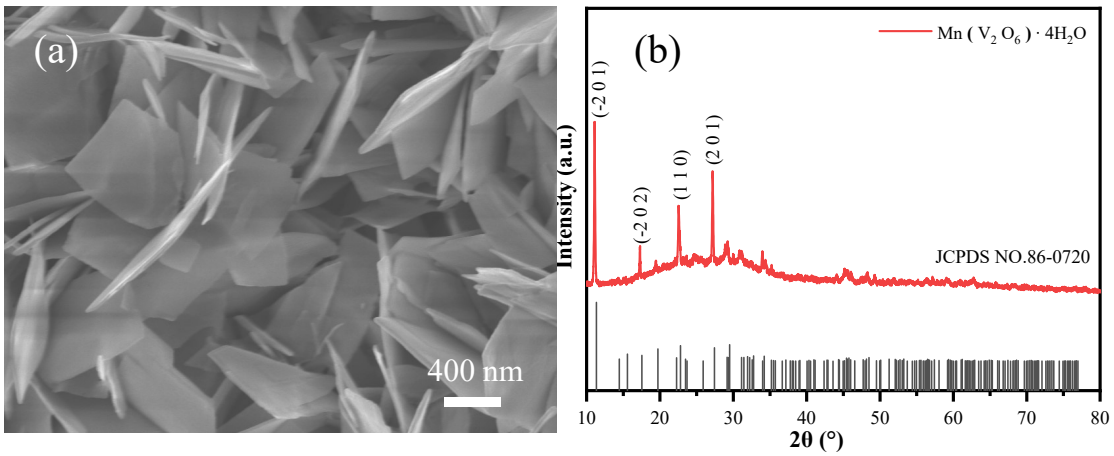

Figure S2 (a) The SEM image and (b) XRD pattern of the $MnV_2O_6{\cdot}4H_2O$.

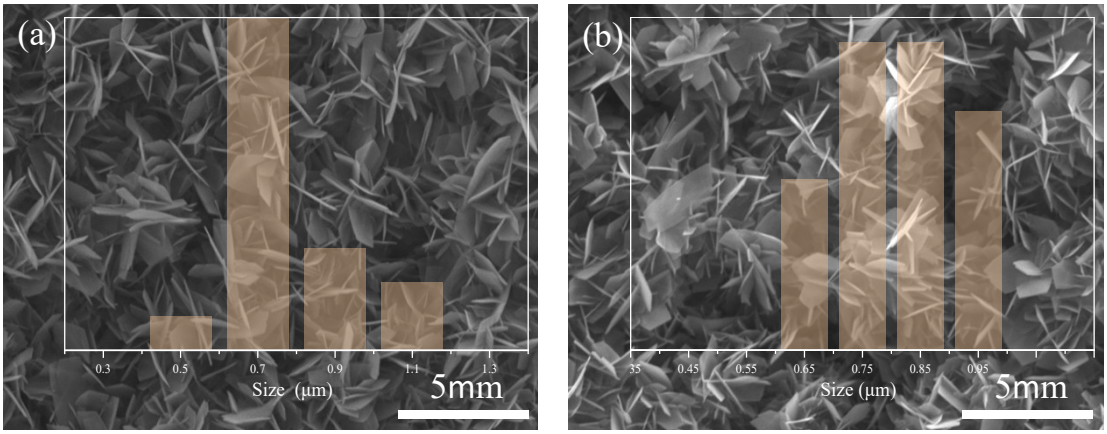

Figure S3 SEM images and the corresponding size statistics of (a) MVO and (b) PMVO.

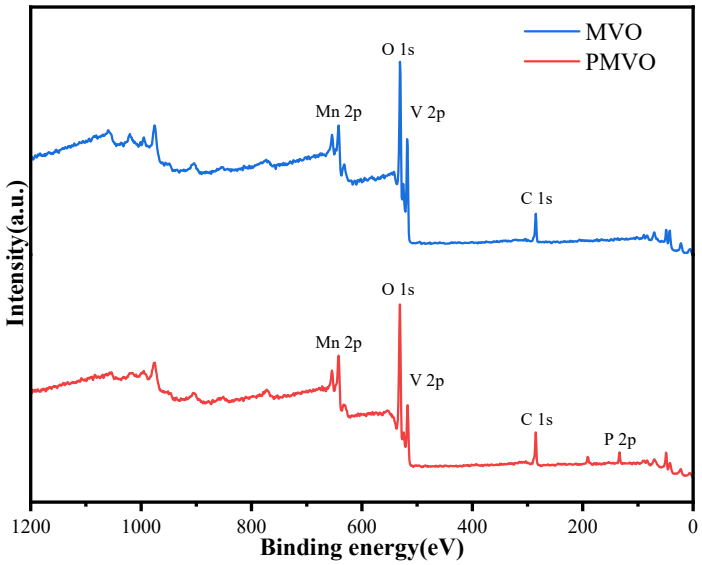

Figure S4 The survey spectra of MVO and PMVO samples.

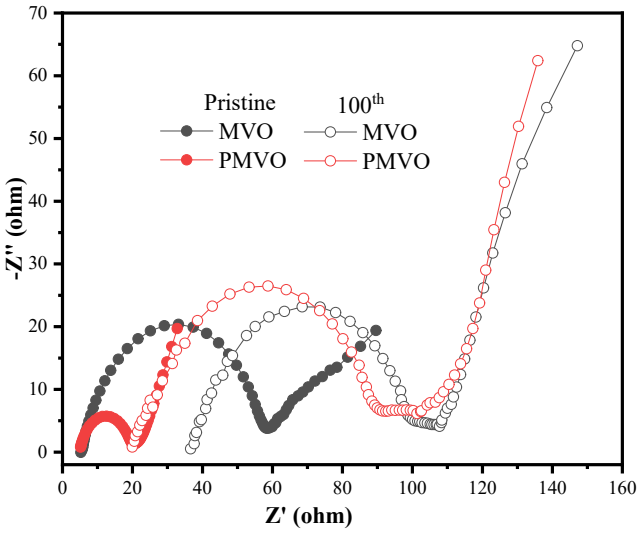

Figure S5 Nyquist plots of MVO and PMVO at pristine state and after cycle to 100 cycles.

Table S1 The R_s and R_{ct} values of MVO and PMVO both pristine state and after cycled 100 times.

	Pristine		100^{th}	
	R_s (Ω)	R_{ct} (Ω)	R_s (Ω)	R_{ct} (Ω)
MVO	5.59	53.05	36.63	64.12
PMVO	5.20	15.22	19.96	69.53

Table S2 The cell parameters of MVO and PMVO after structural optimization.

	a	**b**	**c**	**α**	**β**	**γ**	**Volume**
MVO	9.704	6.333	7.037	90°	106.713°	90°	414.187
PMVO	9.647	6.252	7.063	90°	108.607°	90°	403.710

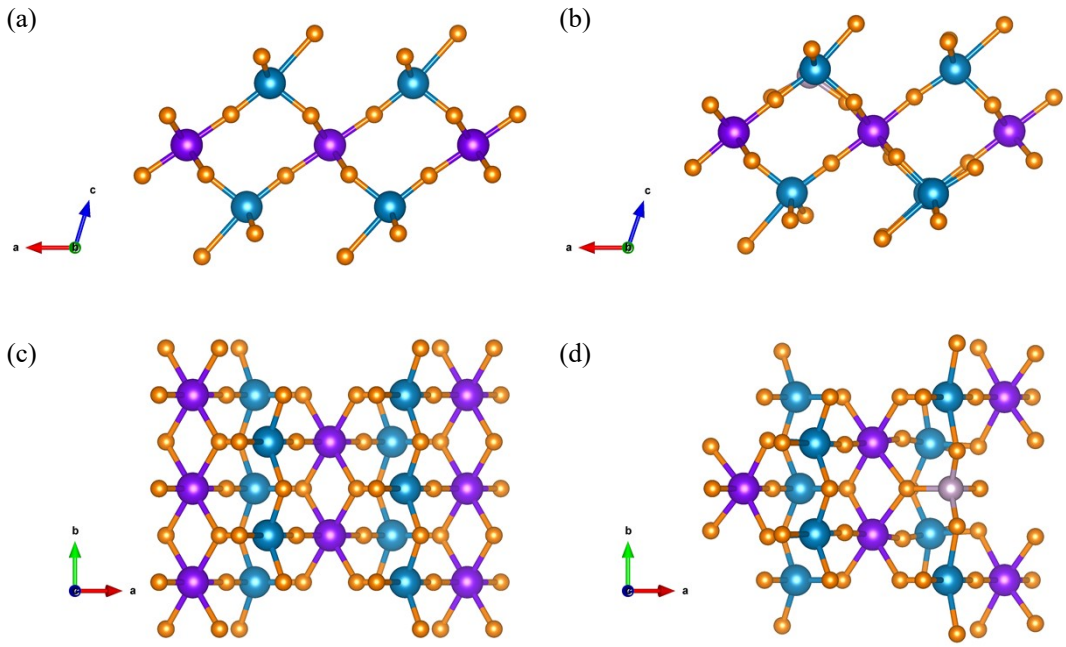

Figure S5 The main views of (a) MVO and (b) PMVO after structural optimization. The top views of (c) MVO and (d) PMVO after structural optimization.

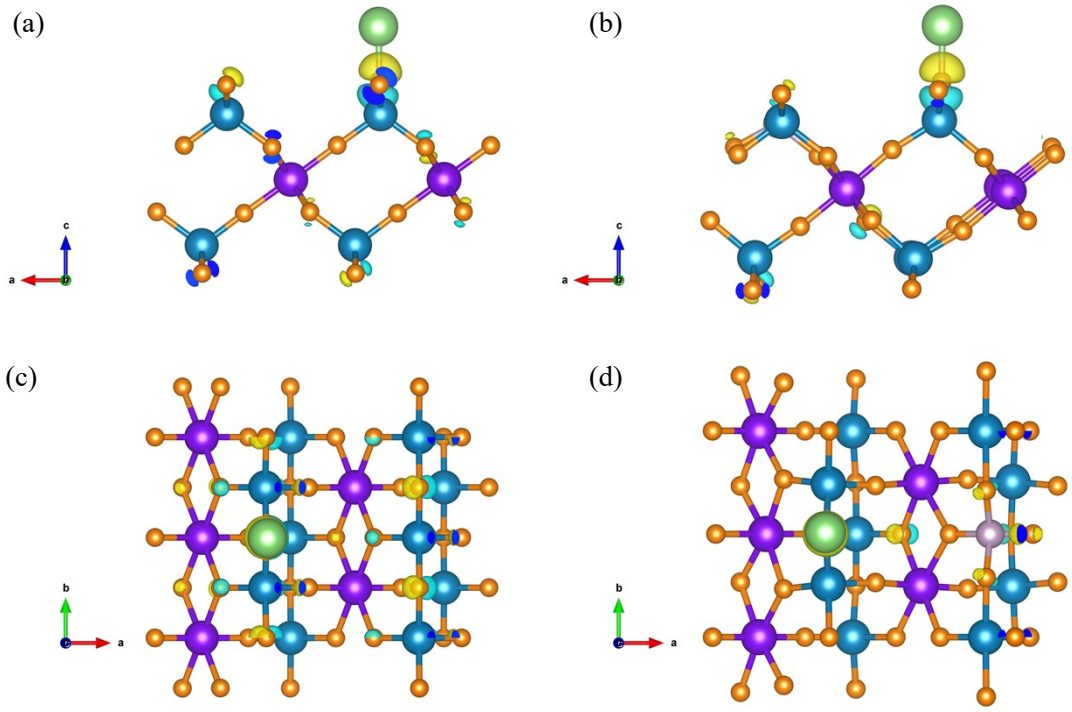

Figure S6 The main views of (a) MVO and (b) PMVO after absorbing one Li^+. The top views of (c) MVO and (d) PMVO after absorbing one Li^+.