

Supporting information

Table S1: Dimensional parameters of different phases during lithiation

Phase	Space group	Unit cell parameter (Å)			Volume (Å ³)
		a	b	c	
α -V ₂ O ₅	Pmmn	11.5440	3.5710	4.3830	180.6831
ϵ -Li _x V ₂ O ₅	Pmmn	11.3552	3.5732	4.6548	188.8657
δ -Li _x V ₂ O ₅	Amam	11.2423	4.9527	3.6018	200.5473
γ -Li _x V ₂ O ₅	Pnma	9.7020	3.6070	10.6640	186.5939

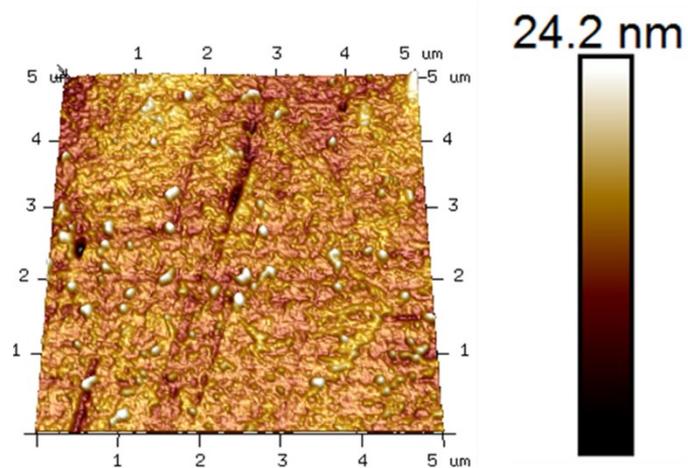


Figure S1. AFM image of a stainless-steel substrate which was used as the substrate for a V_2O_5 thin film battery.

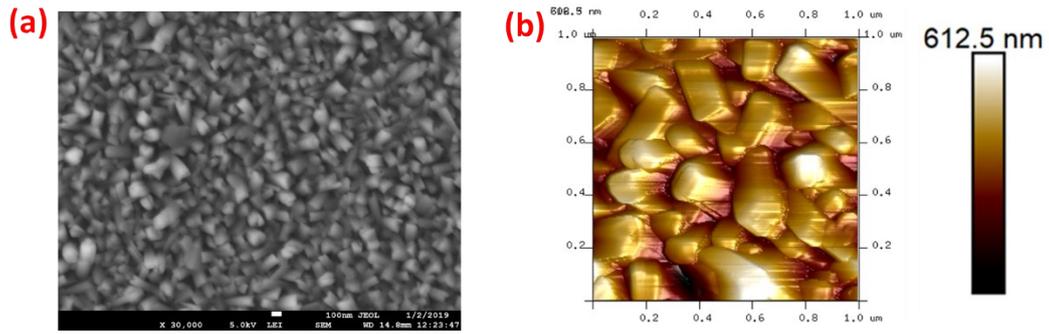


Figure S2. V_2O_5 thin film fabricated through high temperature sputtering. (a) SEM image. (b) AFM image. This film was fabricated using the same parameters mentioned in the experimental details section expect that it was annealed at 350 °C during the sputtering process (as opposed to afterwards).

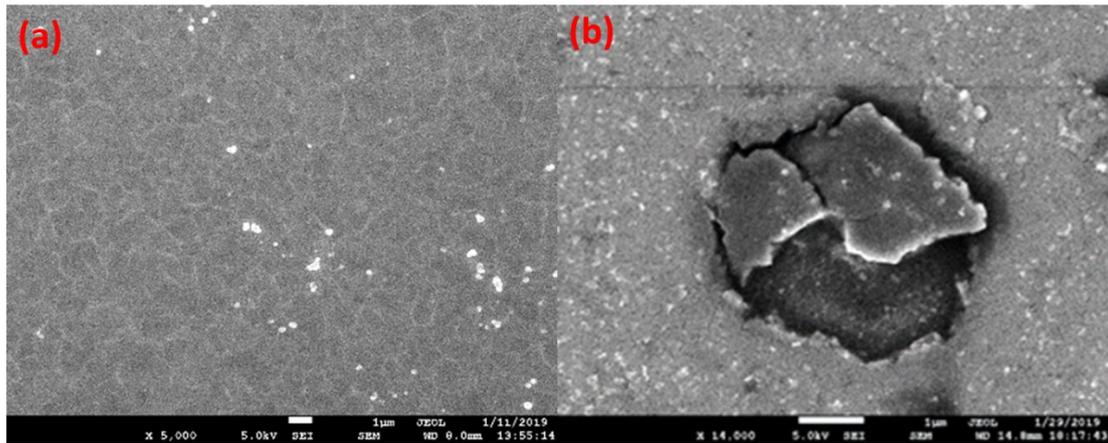


Figure S3 SEM image of pristine V_2O_5 thin film with large field of view. (b) SEM image of V_2O_5 thin film after 50 cycles.

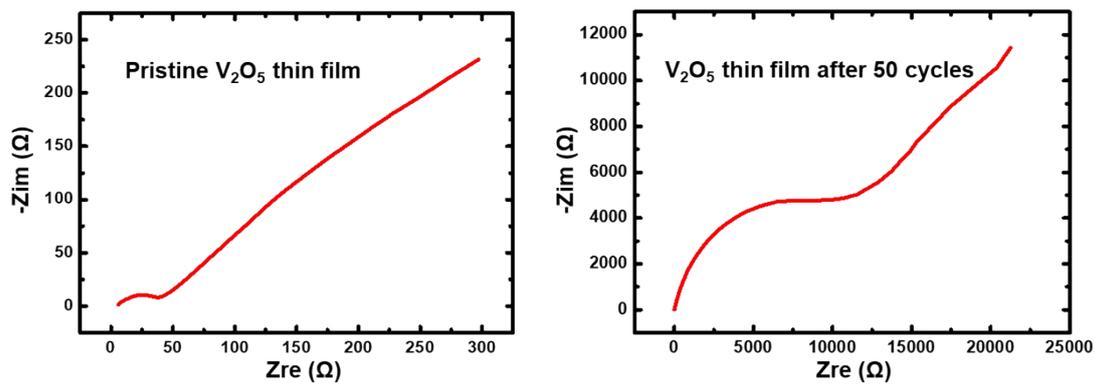


Figure S4. EIS measurement before (left) and after (right) cycling