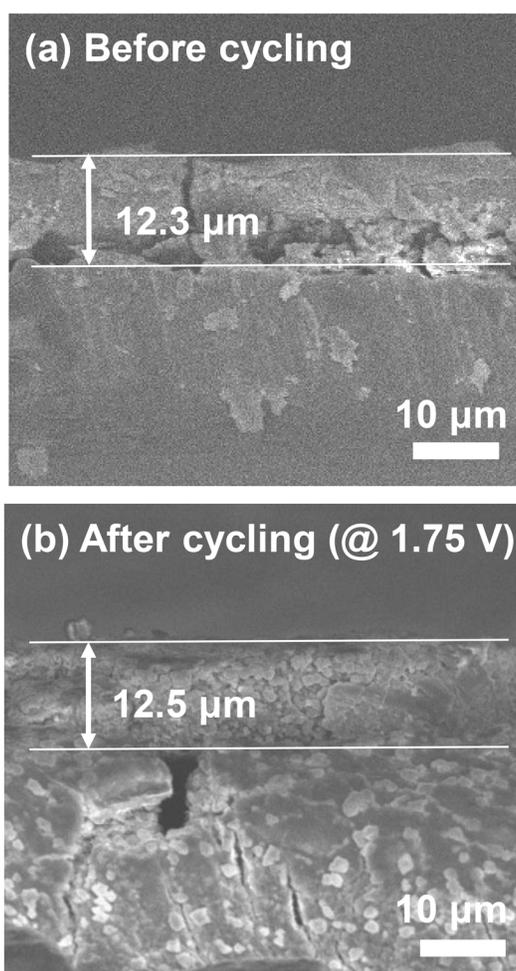
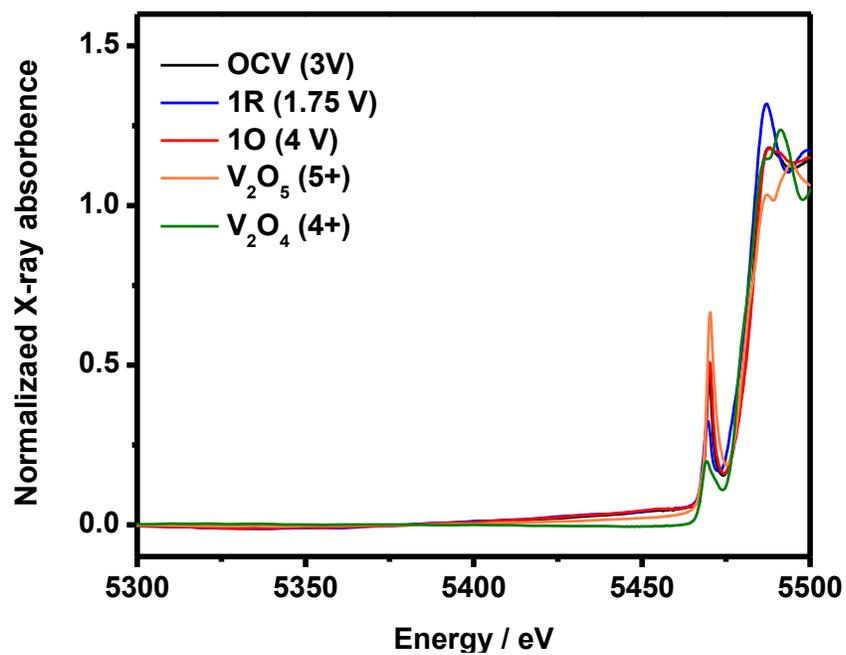


## In-situ X-ray Absorption Near Edge Structure Studies and Charge Transfer Kinetics of $\text{Na}_6[\text{V}_{10}\text{O}_{28}]$ Electrodes\_ Supporting Information

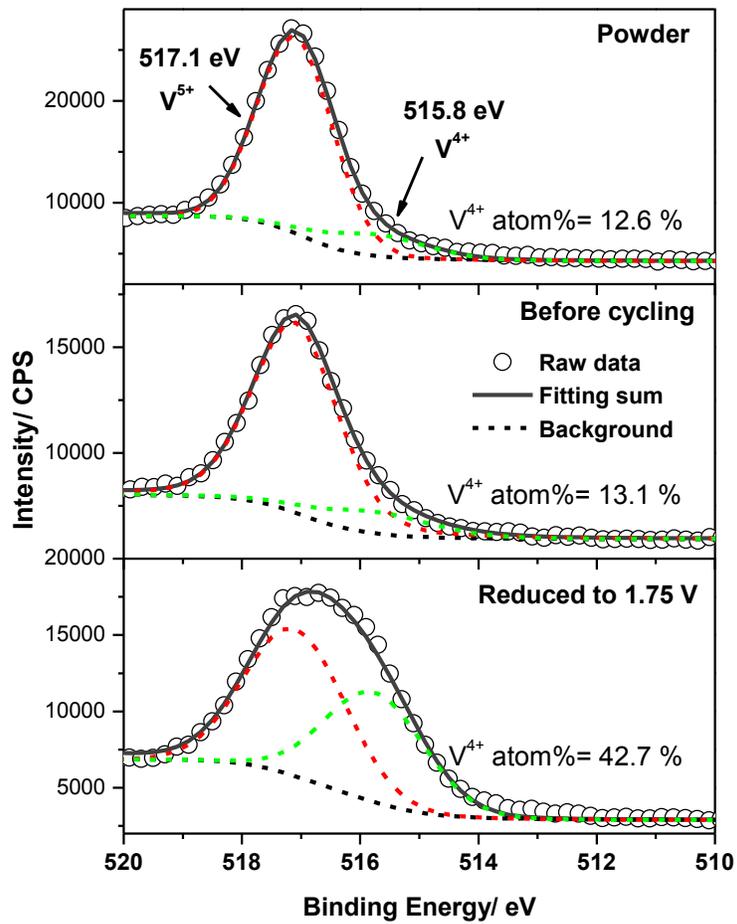
Han-Yi Chen,<sup>1,2,3‡</sup> Jochen Friedl,<sup>1,4‡</sup> Chun-Jern Pan,<sup>5</sup> Ali Haider,<sup>6</sup> Rami Al-Oweini,<sup>6†</sup> Yan Ling Yeah,<sup>7, 8</sup> Ming-Hsien Lin,<sup>5</sup> Ulrich Kortz,<sup>6</sup> Bing-Joe Hwang,<sup>5, 8\*</sup> Madhavi Srinivasan,<sup>1, 3, 7\*</sup> and Ulrich Stimming<sup>1, 2, 4, 9\*</sup>



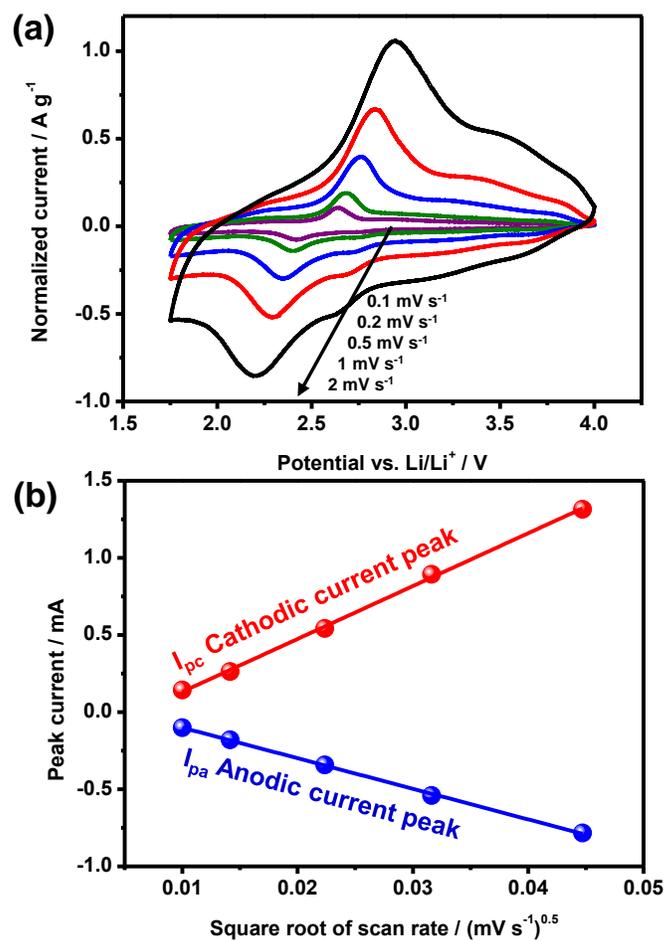
**Figure S1.** SEM cross-section images of  $\text{Na}_6[\text{V}_{10}\text{O}_{28}]$  electrodes before and after cycling (measured at 1.75 V)



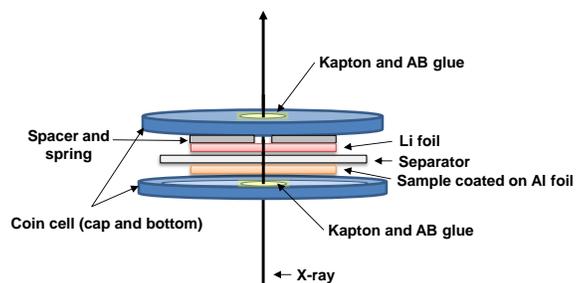
**Figure S2.** Normalized in-situ V K-edge XANES spectra for Na<sub>6</sub>[V<sub>10</sub>O<sub>28</sub>] electrodes in the first cycle at potential of OCV (3 V), first full reduction (1R, 1.75 V), first full oxidation (1O, 4 V) compared with V<sub>2</sub>O<sub>5</sub> and V<sub>2</sub>O<sub>4</sub> reference materials.



**Figure S3.** XPS spectra of Na<sub>6</sub>[V<sub>10</sub>O<sub>28</sub>] powder and electrodes before and after cycling



**Figure S4.** (a) Cyclic voltammograms of Na<sub>6</sub>[V<sub>10</sub>O<sub>28</sub>] electrodes at 0.1, 0.2, 0.5, 1, 2 mV s<sup>-1</sup> in 1 M LiPF<sub>6</sub>/EC:DEC (1:1) in a half-cell configuration with Li metal as counter electrode and reference electrode. (b) Peak current versus square root of scan rate for the main redox peaks in (a).



**Figure S5.** Schematic sketch of the in situ XAS cell. The coated foils were assembled in a 2016 coin cell with circular metallic lithium metal (diameter 16 mm) as the counter electrode, and polyolefin (diameter 19 mm) as separator. The stainless steel cap, bottom, spacer, and spring were punched in order to generate windows for X-ray penetration (beam size:  $2 \times 2 \text{ mm}^2$ ). Those windows were covered with Kapton sealed by AB glue. 1M  $\text{LiPF}_6$  in EC:DEC (1:1 weight %) was employed as electrolyte.