

ADVANCED FUNCTIONAL MATERIALS

Supporting Information

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The Capturing of Ionized Oxygen in Sodium Vanadium Oxide
Nanorods Cathodes under Operando Conditions

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Qinyou An,* Guobin Zhang, Xiujuan Wei, Wenhao Ren, and
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Table S1. The amount of SDS, V_2O_5 , theoretical reaction ratio of SDS: V_2O_5 in $Na_{0.76}V_6O_{15}$ nanorods and the purity of final production.

SDS (mg)	46.0	60.0	80.0
V_2O_5 (mg)	113.3	113.3	113.3
Theoretical reaction ratio of SDS: V_2O_5 in $Na_{0.76}V_6O_{15}$ nanorods	1 : 1	1.3 : 1	1.7 : 1
Purity	NO	NO	YES

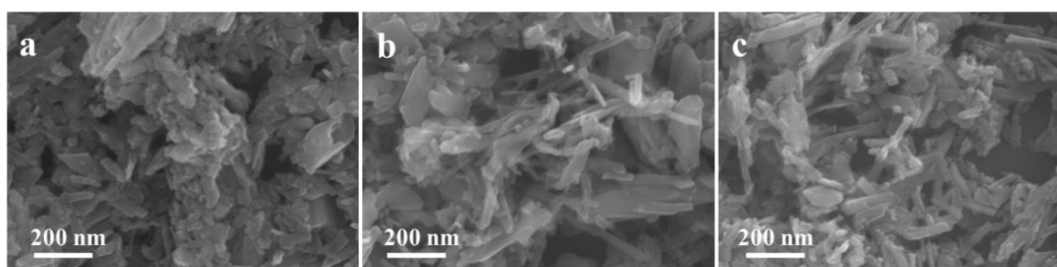


Figure S1. SEM images of the $Na_{0.76}V_6O_{15}$ with (a) 0 mg, (b) 20 mg and (c) 50 mg acetylene black and 80 mg sodium dodecyl sulfate (SDS).

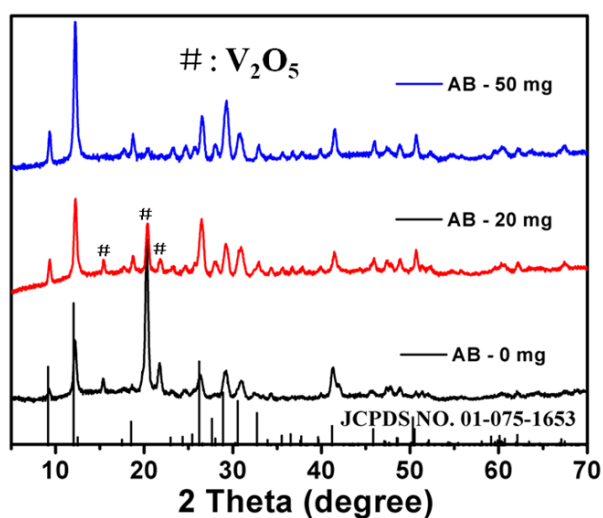


Figure S2. XRD patterns of the $Na_{0.76}V_6O_{15}$ with (a) 0 mg, (b) 20 mg, (c) 50 mg acetylene black and 80 mg SDS.

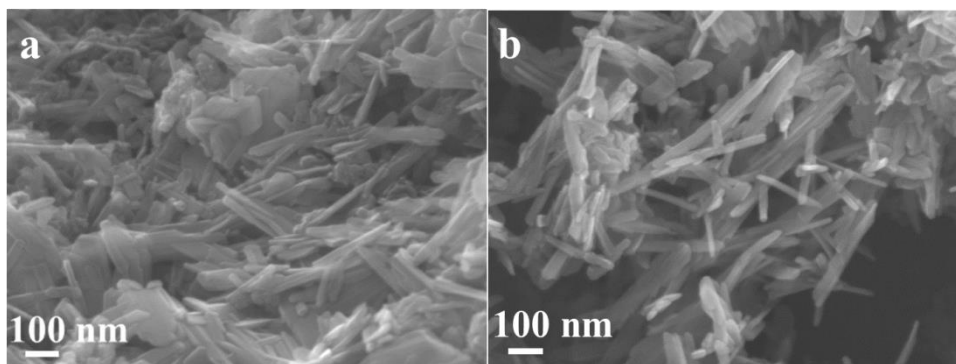


Figure S3. SEM images of the Na_{0.76}V₆O₁₅ with 100 mg acetylene black and (a) 46 mg, (b) 60 mg SDS.

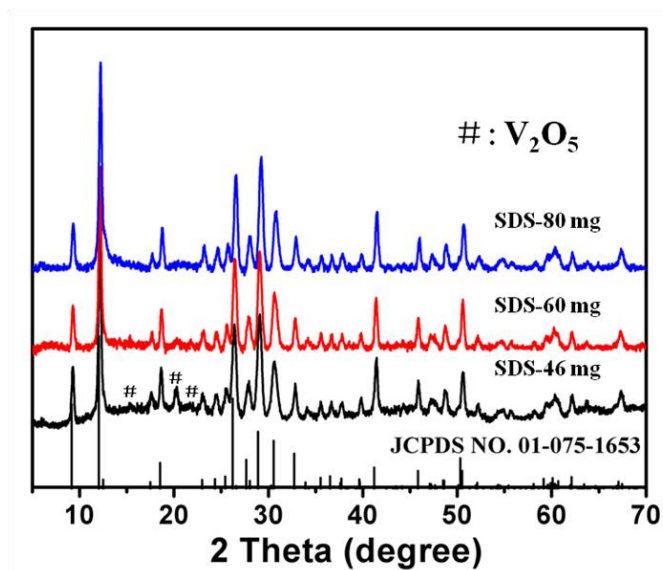


Figure S4. XRD patterns of the Na_{0.76}V₆O₁₅ with (a) 46 mg, (b) 60 mg, (c) 80 mg SDS and 100 mg acetylene black.

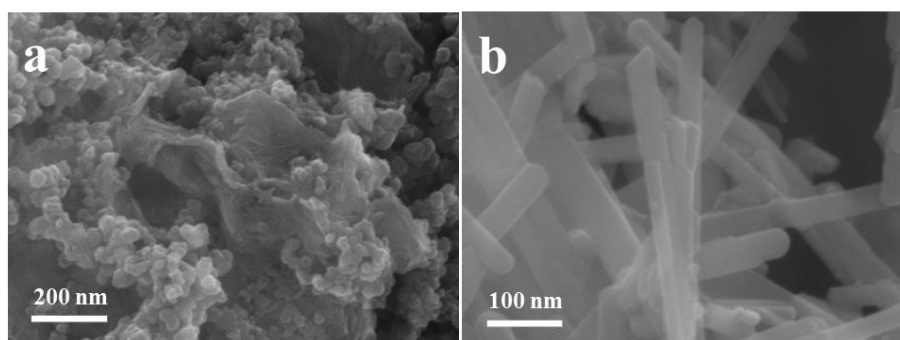


Figure S5. SEM images of the Na_{0.76}V₆O₁₅ annealed at (a) 350 °C, (b) 500 °C with 100 mg acetylene black and 80 mg SDS.

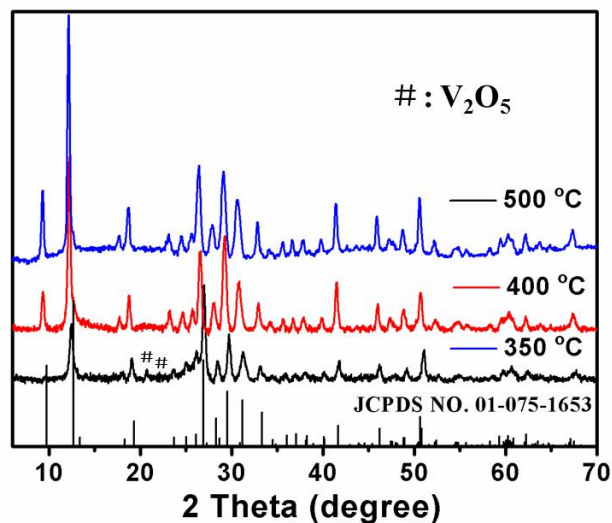


Figure S6. XRD patterns of the $\text{Na}_{0.76}\text{V}_6\text{O}_{15}$ after annealed at (a) 350 °C, (b) 400 °C (c) 500 °C with 100 mg acetylene black and 80 mg SDS.

The XRD patterns annealed at a temperature of 400 °C with less acetylene black (20 mg; Figure S2) is similar to sample with a lower annealing temperature of 350 °C (Figure R3; Figure S6 in the supplementary information). Both of them included impurity peaks that can ascribed to the V_2O_5 can further confirm the function of the acetylene black, which provides extra heat for the formation of the $\text{Na}_{0.76}\text{V}_6\text{O}_{15}$ nanorods.

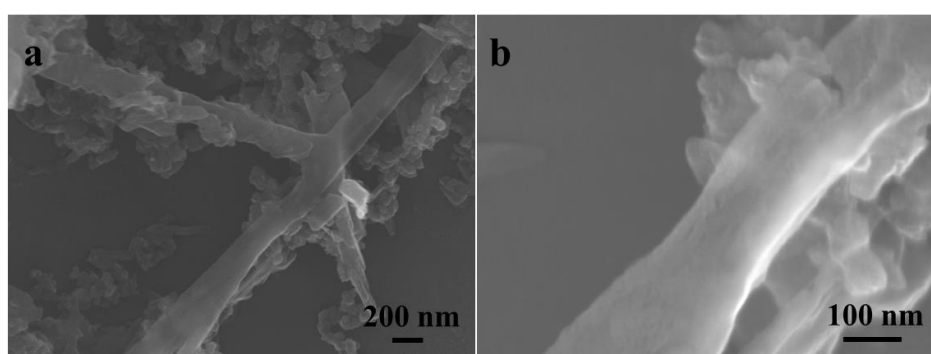


Figure S7. The SEM images of the $\text{Na}_{0.76}\text{V}_6\text{O}_{15}$ nanorod electrode discharged to 2.0 V.

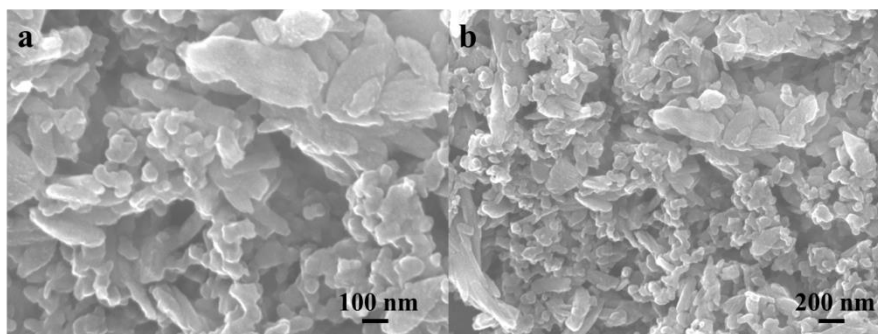


Figure S8. The SEM images of the $\text{Na}_{0.76}\text{V}_6\text{O}_{15}$ nanorod electrode discharged to 1.5 V.

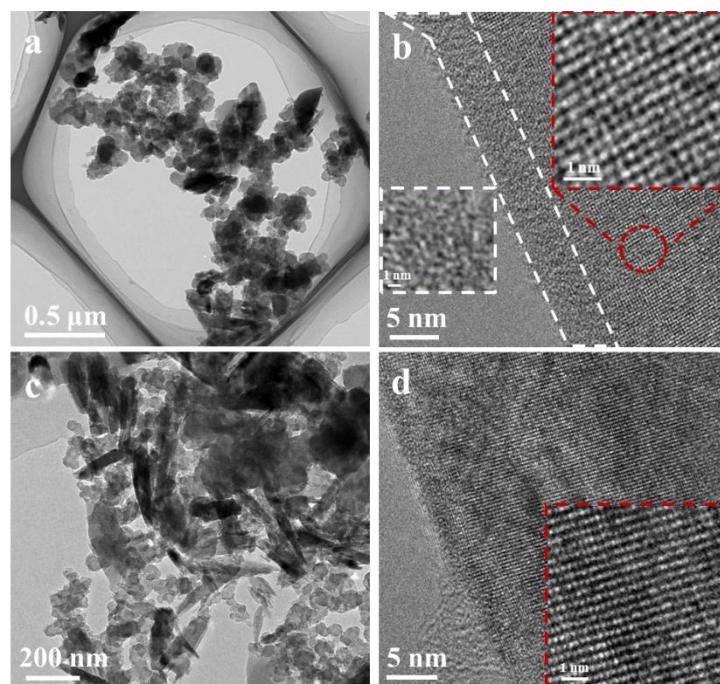


Figure S9. TEM and HRTEM after cycled within (a, b) 1.5 – 4.0 V and (c, d) 2.0 – 4.0 V.

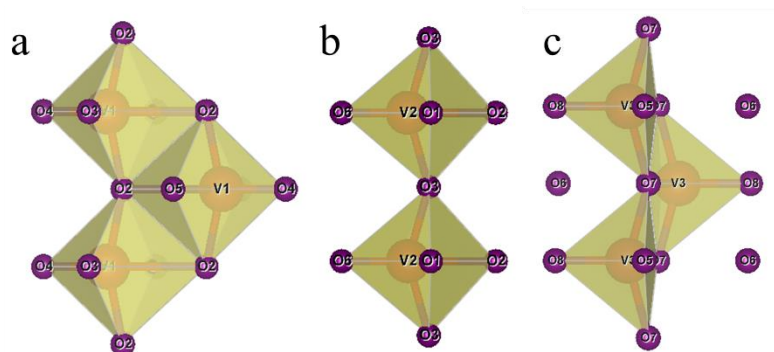


Figure S10. Local environments of V1, V2 and V3 atoms in $\text{Na}_{0.76}\text{V}_6\text{O}_{15}$.