# Supplemetary Information

## Ordered Mesoporous $WO_{3-x}$ Possessing Electronically Conductive Framework Comparable to Carbon Framework toward Long-Term Stable Cathode Supports for Fuel Cells

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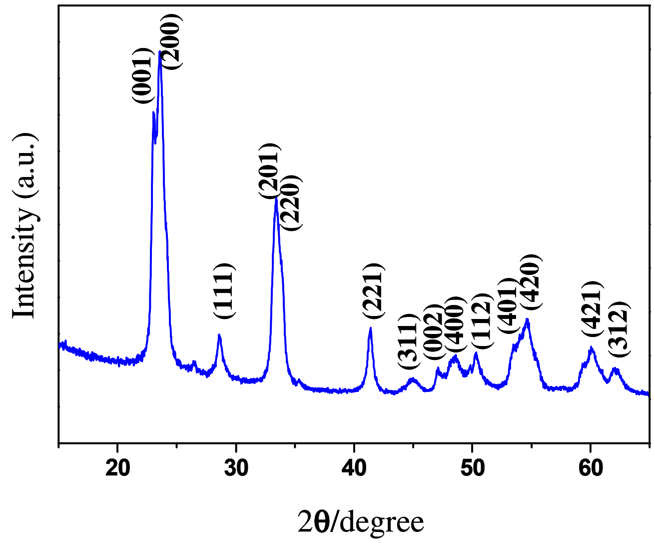


**Fig. S1.** XRD pattern of $WO_3$/KIT-6 composite. The diffraction peaks can be indexed to Tetragonal $WO_3$ (JCDPS: 89-1287).

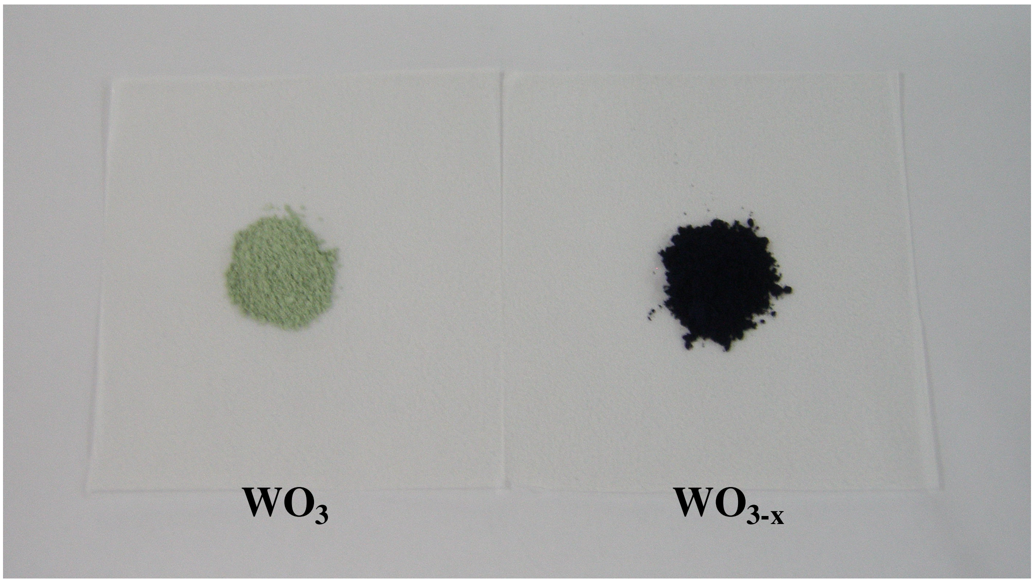


**Fig. S2**. Picture showing the colors of mesoporous $WO_3$ and mesoporous $WO_{3\text{-}X}$.

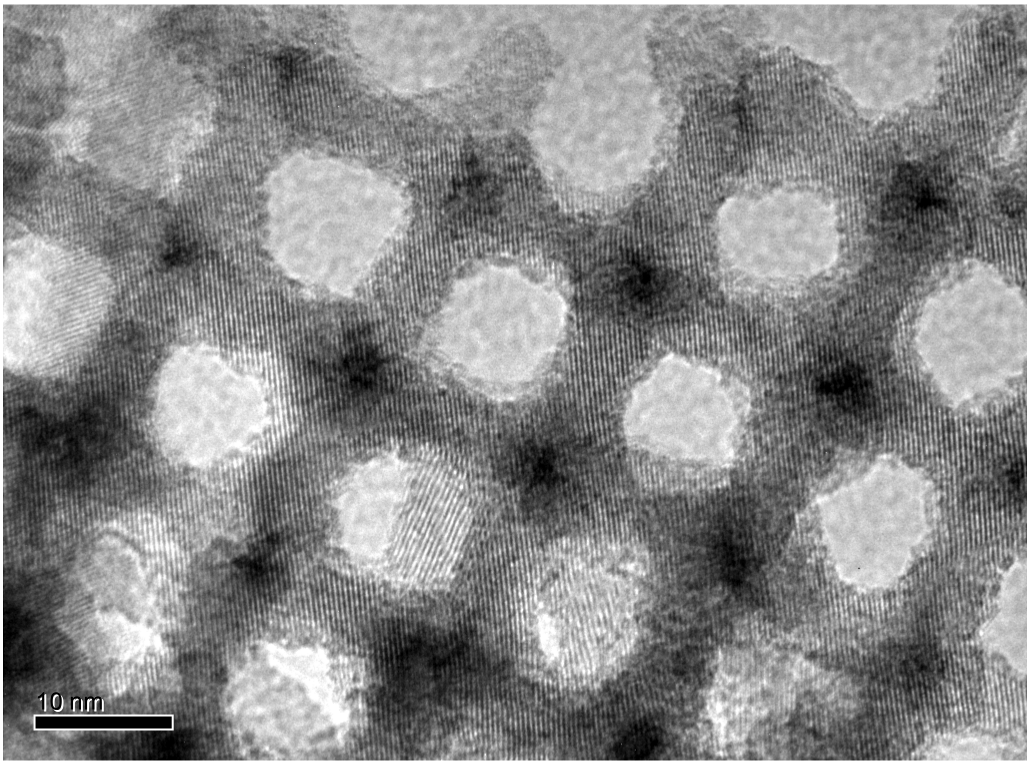


**Fig. S3**. HRTEM image of $WO_{3-x}$ showing single-crystalline framework over several repeating units of ordered mesopores.

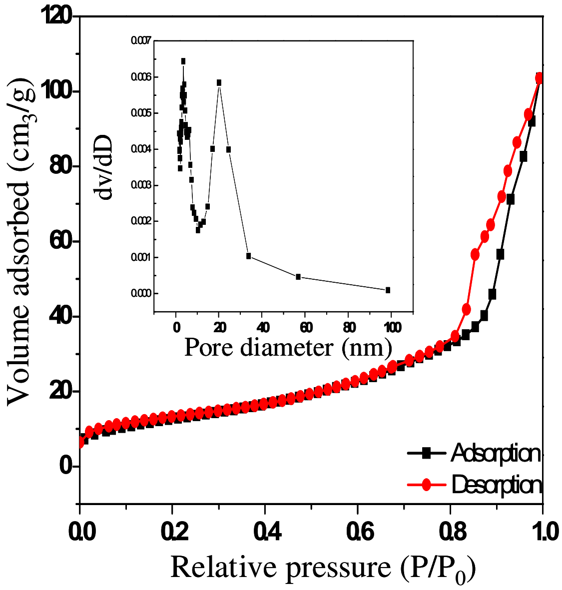


**Fig. S4**. Pore size distribution of mesoporous $WO_3$ synthesized through KIT-6 hard template.

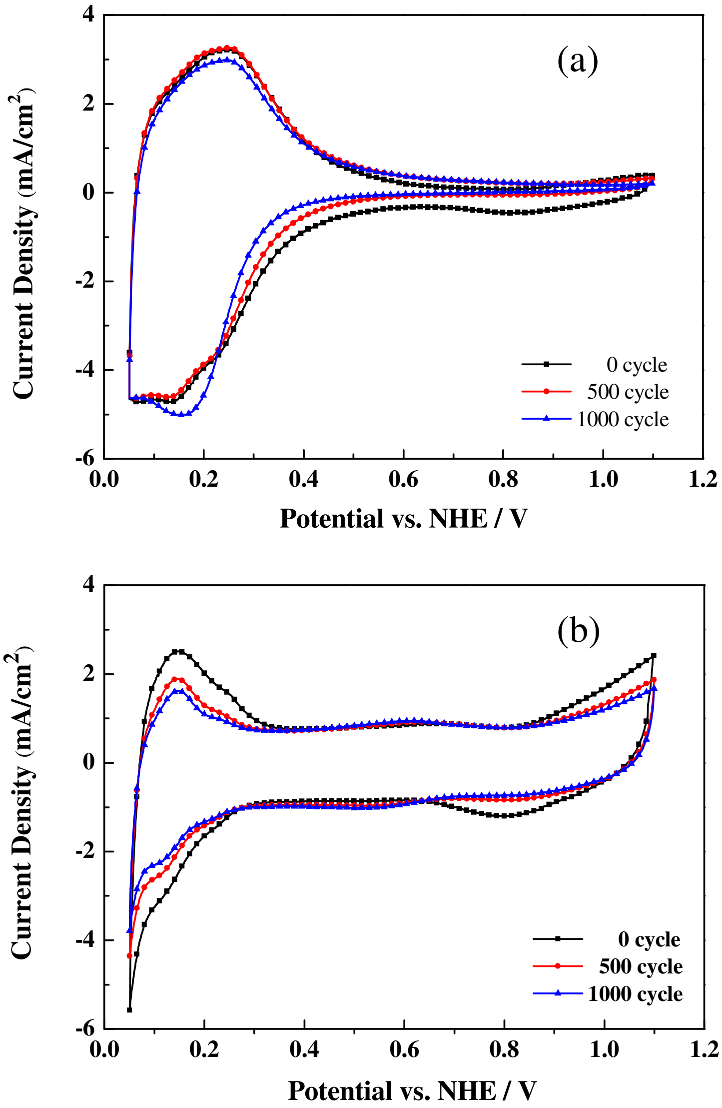


**Fig. S5**. Cyclic voltammograms for (a) Pt/Mesoporous $WO_{3-x}$ and (b) Pt/C before and after 500 and 1000 cycles, respectively.

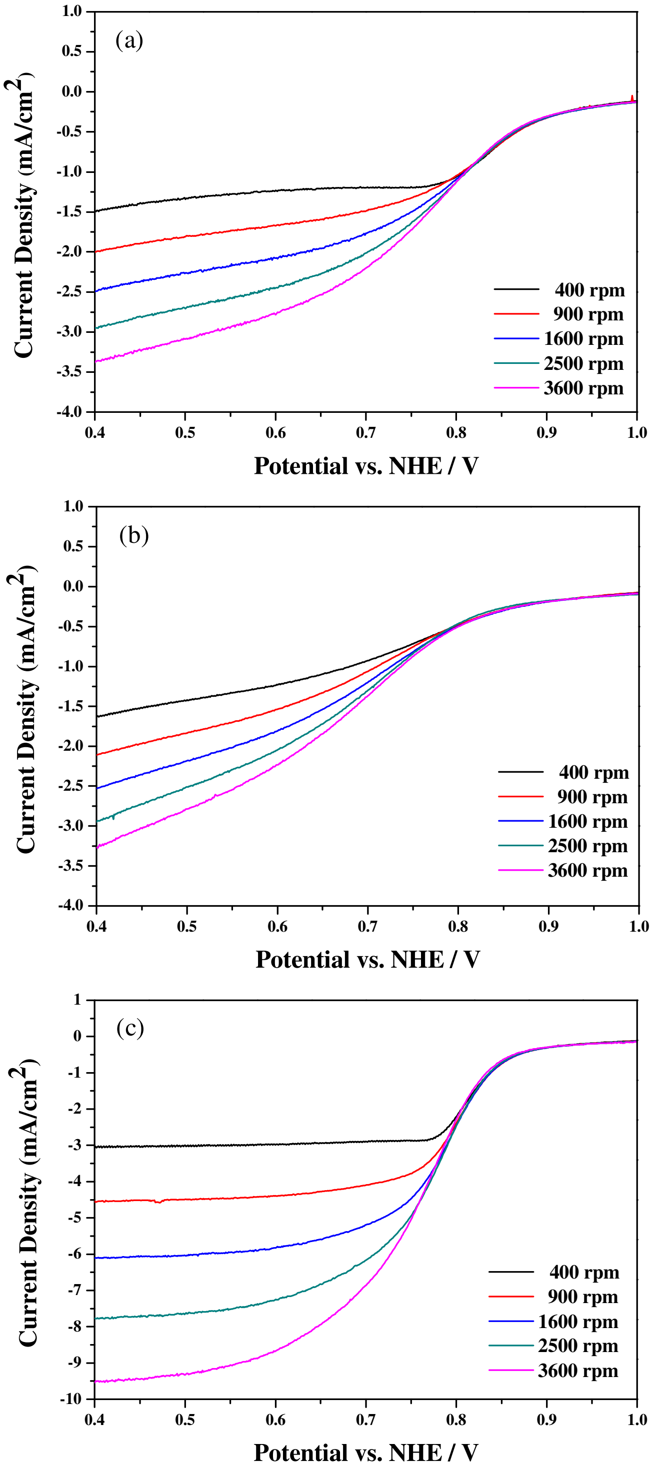


**Fig. S6**. Linear potential scan curves of (a) Pt/Mesoporous $WO_{3-X}$, (b) Pt/Mesoporous $WO_3$ and (c) Pt/Vulcan XC-25 on rotating disk electrodes in $O_2$-saturated 0.5 M $H_2SO_4$ solution at 25 °C; sweep rate: 5 mV $s^{-1}$.

# The details on how the conductivity was measured

As described in the reference papers [*J. Electrochem Soc*, 2000, 147, 2507, *Philips Technical Review*, 20, 220 (1958/1959)], the conductivity of powder materials were measured as follows. Based on the four-probe van der Pauw method, powder materials were placed within a polyehthylene (PE) cylinder with one end closed. The conductivity was measured with the four probes contacted to the powder sample while the pressure was applied with a PE rod (applied pressure was about 100 kgf cm$^{-2}$) in order to make the particles contacted each other. The current applied between neighboring two probes was varied from 0.01 to 0.5 mA and the resulting voltage drop between the other two probes was collected. The probes for current application were changed and voltage drop was estimated. Using the calibration process given in the latter reference paper, conductivity was measured. The schematic illustration for conductivity measurement which we have utilized was shown in the following figure.