Supplementary Information

High-performance electrochromo-supercapacitors based on the synergetic effect between aqueous Al^{3+} and ordered hexagonal tungsten oxide nanorod arrays

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Table S1 A summary of the electrochromic or capacitive performance based on different tungsten oxide materials and electrolytes ("/" indicates that this project has not been studied).

Tungsten oxide materials based on different morphology and structure	Electrolytes	EC performance			Capacitive performance	Stability (retention of capacity/ΔT)	References
		ΔT (%)	Coloring/ bleaching time (s)	CE ($cm^2 \cdot C^{-1}$)	Specific capacitance		
Ti-doped WO_3 film [1]	H_2SO_4	49.1	1.7/1.6	68	/	/	Tu's group [1-4]
Mo-doped WO_3 nanowire array [2]	H_2SO_4	56.7	3.2/2.6	123.5	~182.9 $F \cdot g^{-1}$ (1 $A \cdot g^{-1}$, -0.7~0.4 V)	38.2% (4 A g^{-1}, 5500 cycles)	
TiO_2@WO_3 core/shell nanorod arrays [3]	H_2SO_4	57.2	2.4/1.6	67.5	/	65.1% (CA test, 10000 cycles)	
WO_3/polyaniline core/shell nanowire array [4]	H_2SO_4	59	2.2/3.4	86.3	/	/	
porous WO_3 film [5]	H_2SO_4	97.7	6/2.7	118.3	/	/	Lee's group [5-6]
WO_3 nanorods [6]	H_2SO_4	33.9	25.2/18	37.6	/		
amorphous WO_x film	$LiClO_4$/PC	72	55/30	132	/	The color switching speed drops seriously after 1000 laps	Deepa *et.al* [7]
crystalline/amorphous tungsten oxide core/shell heterostructures	$LiClO_4$/PC	44	41/6	82	/	6% decay in ΔT after 1000 cycles	Her *et.al* [8]
amorphous WO_x film	$Al(ClO_4)_3$/ $LiClO_4$/PC	91.3	13.5/35.6	11~16	/	> 90% (CA test, 1000 cycles)	Diao's group [9]
WO_3 thin films	$Al(ClO_4)_3$/PC	87	12/12	67.59	/	almost unchanged (30 cycles)	Qiu *et.al* [10]
$W_{18}O_{49}$ nanowires/carbon nanotubes complex material	$AlCl_3$ aqueous solution	/	/	/	216 $F \cdot g^{-1}$ (about 0.4 $A \cdot g^{-1}$, -0.7~0.6 V)	94.8% (5 $mV \cdot s^{-1}$, 5000 cycles)	Li *et.al* [11]
mesoporous WO_{3-x}/carbon compound	H_2SO_4	/	/	/	103 $F \cdot g^{-1}$ (1 $mV \cdot s^{-1}$, -0.2~0.8 V *vs.*Ag/AgCl)	/	Jo *et.al* [12]
mesoporous WO_{3-x}	H_2SO_4	/	/	/	199 $F \cdot g^{-1}$ (about 0.03 $A \cdot g^{-1}$, -0.1~0.8 V *vs.* SCE)	/	Yoon *et.al* [13]
crystalline WO_3–$WO_3 \cdot 0.5H_2O$ mixtures	H_2SO_4	/	/	/	290 $F \cdot g^{-1}$ (25 $mV \cdot s^{-1}$, -0.6~0.2 V *vs.* Ag/AgCl)	/	Chang *et.al* [14]
h-WNRAs	$AlCl_3$ aqueous solution	81.5	9/14	149.9	235.4 $F \cdot g^{-1}$ at 1 $A \cdot g^{-1}$ (-0.7~0 V *vs.*Ag/AgCl)	1.8% decay in ΔT after 10000 s-color-switching process//86.2% retention of capacity after 4000 cycles (stable after first 300-400 cycles)	this work

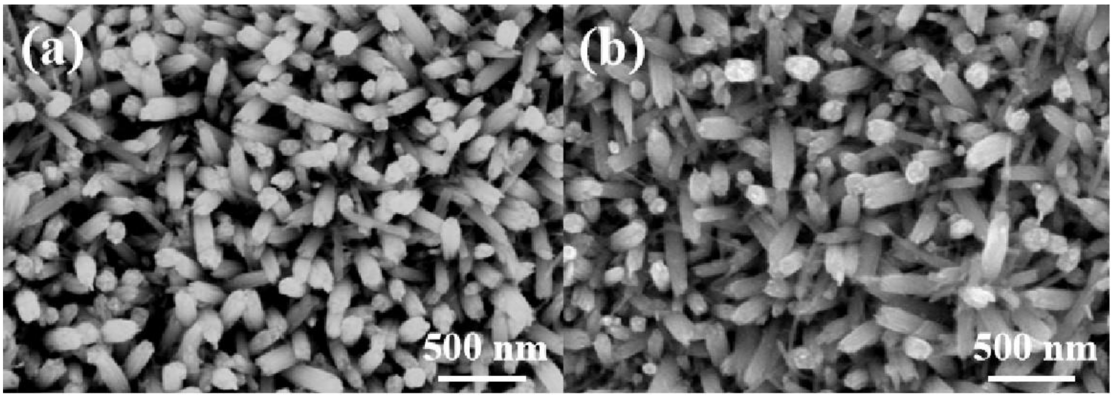

Fig. S1 SEM images of the h-WNRAs material before (a) and after (b) 4000 cycles of galvanostatic test at 5 $A \cdot g^{-1}$.

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