Electronic Supplementary Material (ESI) for RSC Advances


# Supporting Information

## Hierachical $TiO_2$ Nanobelts@$MnO_2$ Ultrathin Nanoflakes Core/Shell Arrays Electrode Materials for Supercapacitors

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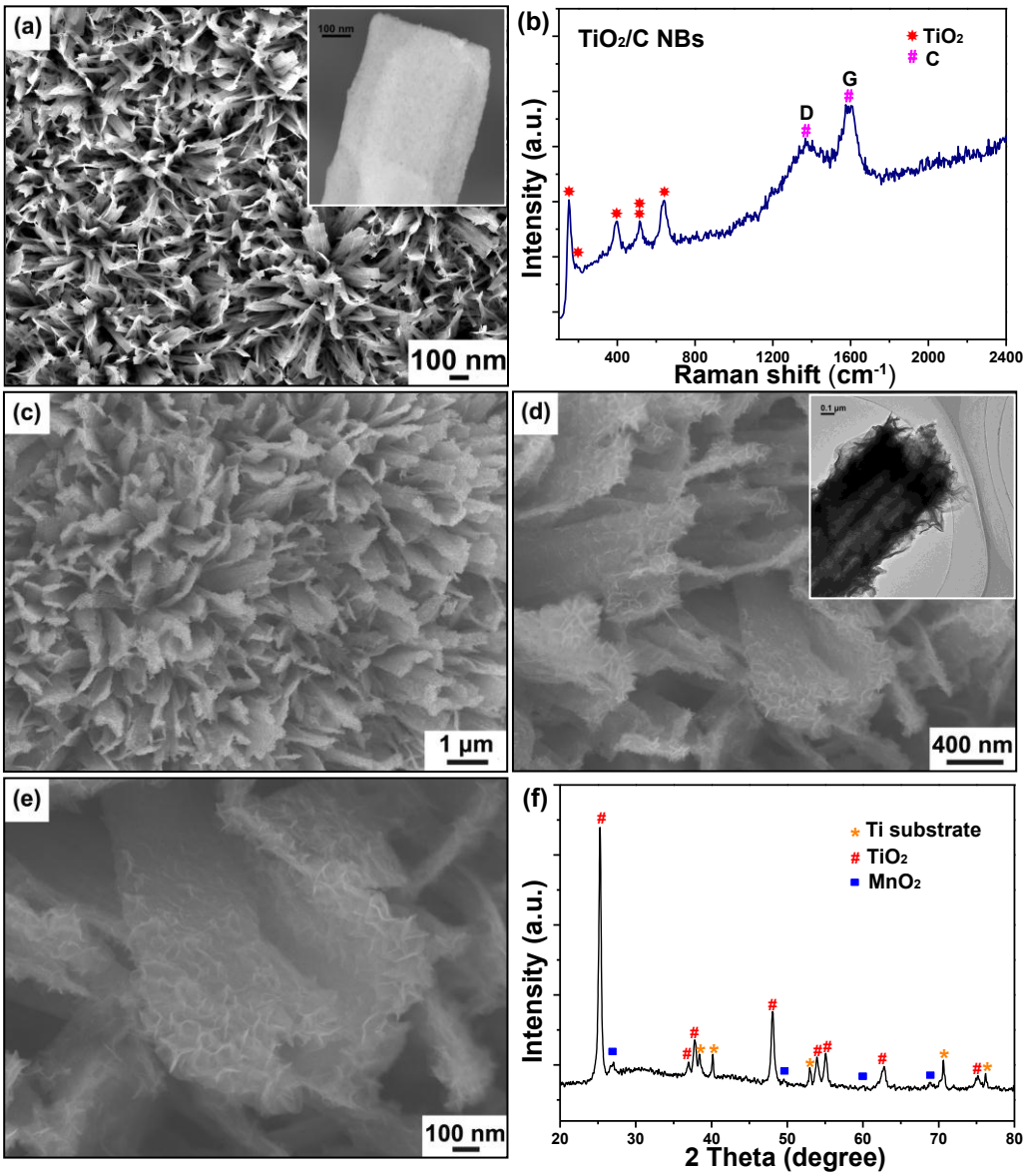


**Fig. S1** (a) SEM image of the carbon-coated $TiO_2$ nanobelt arrays. The inset shows enlarged images. (b) Raman spectrum of the carbon-coated $TiO_2$ NBs. (c,d,e) Low-magnification and enlarged SEM images of the $TiO_2$@$MnO_2$ nanobelt arrays obtained after 3 h of growth, and TEM image of a $TiO_2$ nanobelt was shown in the insets of (d). (f) XRD patterns of as-prepared $TiO_2$@$MnO_2$ nanobelt arrays obtained after 3 h of growth.

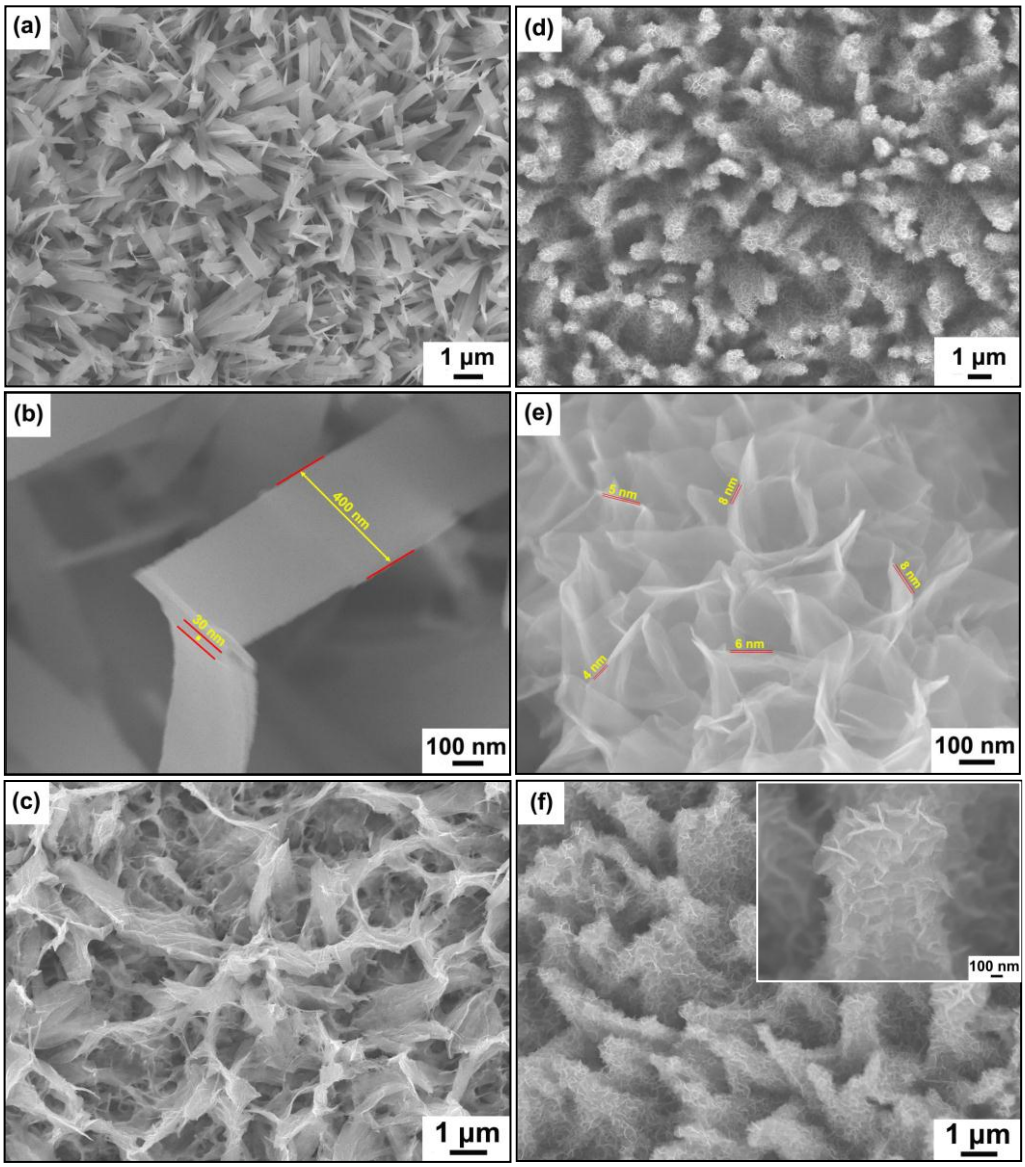


**Fig. S2** (a, b) Low-magnification and enlarged SEM images of the $TiO_2$ nanobelt arrays. (c) SEM image of the $TiO_2$ nanobelt arrays after 3000 cycles. (d, e) Low-magnification and enlarged SEM images of the $TiO_2$@$MnO_2$ nanobelt arrays. (f) SEM image of the $TiO_2$@$MnO_2$ nanobelt arrays after 3000 cycles. The inset shows enlarged images.

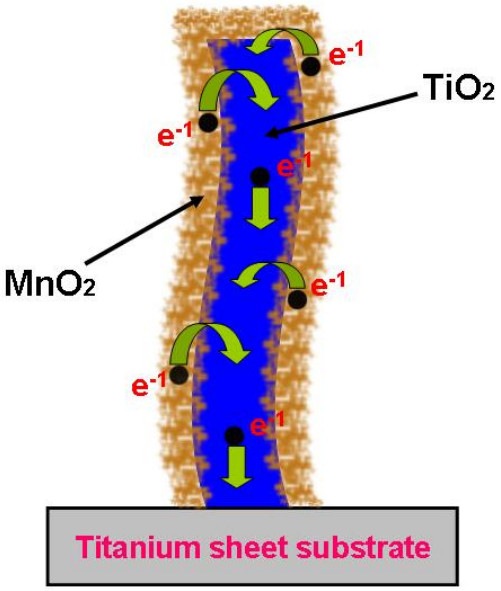


**Fig. S3** Schematic image of the amorphous $MnO_2$ loaded on the $TiO_2$ nanobelt grown on the titanium steel substrate. The $TiO_2$ nanobelt provides a direct path for the electrons.

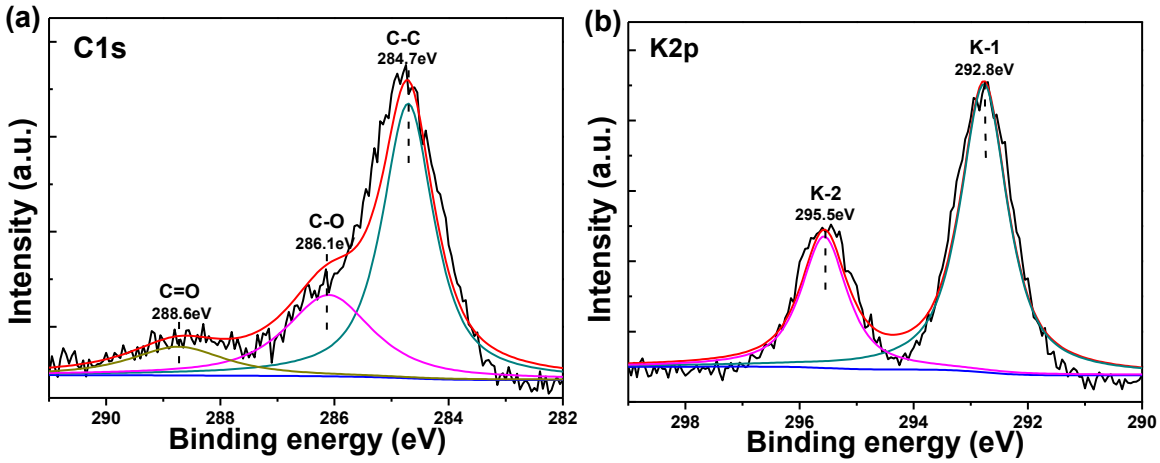


**Fig. S4** (a) C1s XPS spectra; (b) K2p XPS spectra for the $TiO_2$@$MnO_2$ NBAs obtained after 5 h of growth.

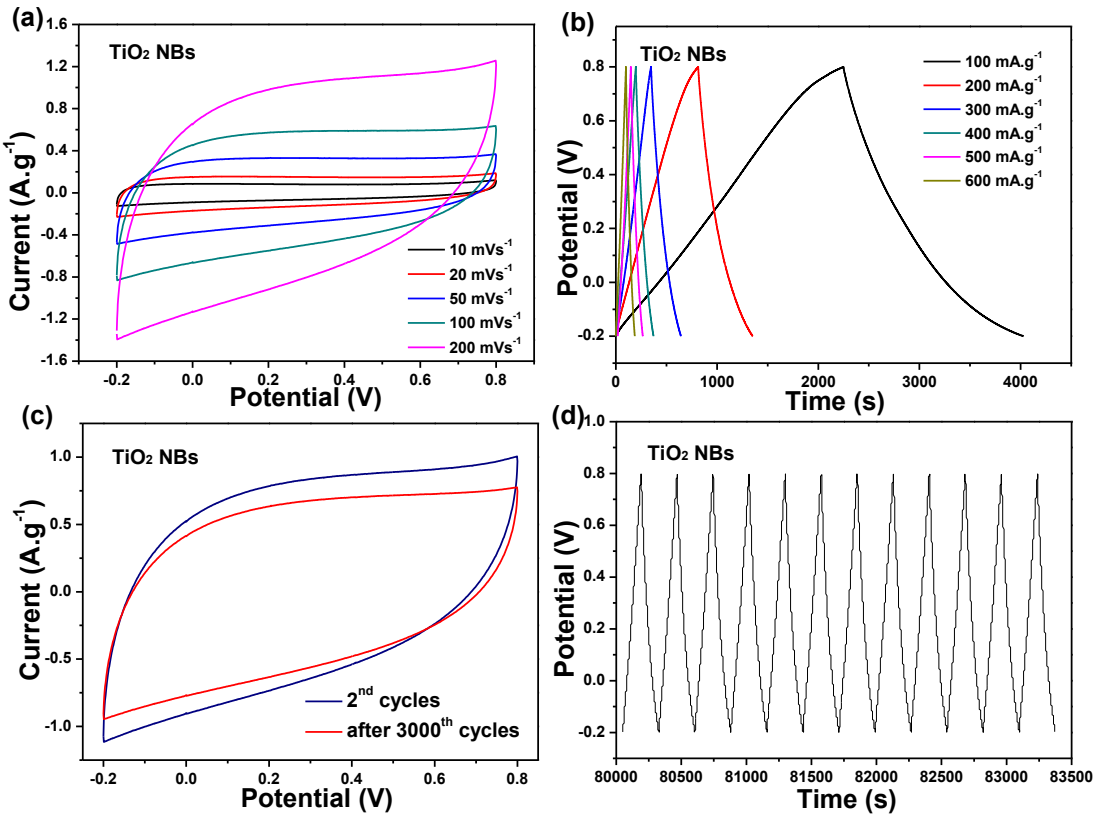


**Fig. S5** (a) The cyclic voltammogram (CV) curves of $TiO_2$ NBs at different scan rates. (b) Charge/discharge curves of $TiO_2$ NBs at various current densities. (c) Comparison of the CV curves for $TiO_2$ NBs between $2^{nd}$ cycles and after $3000^{th}$ cycles for CV test at 200mV $s^{-1}$. (d) The charge/discharge curves of the last 12 cycles at 3 A $g^{-1}$ for the $TiO_2$ NBs.

**Table 1. Specific capacitance, power density, and energy density of the $TiO_2/MnO_2$ NBAs composite at different current densities (based on the mass of $MnO_2$)**

| current density (A $g^{-1}$) = | 2 | 1 | 0.8 | 0.5 | 0.2 |
|---|---|---|---|---|---|
| specific capacitance (F $g^{-1}$) = | 54 | 128.4 | 160 | 242.5 | 454.2 |
| power density (kW $kg^{-1}$) = | 1 | 0.5 | 0.4 | 0.25 | 0.1 |
| energy density (Wh $kg^{-1}$) = | 7.5 | 17.8 | 22.2 | 33.7 | 63.1 |