Supporting Information

Nanosheet Arrays of TiN Prepared Directly on Ti Foils for High-Performance Supercapacitance

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**Figure S1.** SEM images of the (150, t)-H$_2$Ti$_2$O$_4$(OH)$_2$ films on Ti foil (t = 12, 24).
Figure S2. SEM images of the (180, t)-H$_2$Ti$_2$O$_4$(OH)$_2$ films on Ti foil (t = 12, 24, 36, 48).
Figure S3. SEM images of the (200, t)-H$_2$Ti$_2$O$_4$(OH)$_2$ films on Ti foil (t = 24, 48, 72, 96).
Figure S4. SEM images of (200, t)-TiN nanosheet arrays on Ti foil (t = 24, 48, 72, 96) by using the one-step nitridation method.
Figure S5. (a) CV curves collected for the (200,48)-TiN nanosheet electrodes prepared using the one-step and two-step methods in 1 M KOH electrolyte at a scan rate of 100 mV/s. (b) CV curves of the (200,48)-TiN nanosheet electrode prepared by the one-step method in 1 M KOH electrolyte with different scan rates.
Figure S6. (a, c, e) Cyclic voltammetry and (b, d, f) Galvanostatic charge/discharge curves measured for (200, t)-TiN nanosheet electrodes (t = 24, 48 and 72).
Figure S7. SEM images collected for (200,72)-TiN electrode at 4000\textsuperscript{th} cycles.
Table S1. Specific capacitances $C_s$ of the TiN electrodes determined from galvanostatic charge/discharge measurements

| TiN sample          | Current density (mA g$^{-1}$) | Electrolyte KOH | $C_s$ (F g$^{-1}$) | Ref.   |
|---------------------|-------------------------------|-----------------|--------------------|--------|
| TiN nanorods$^a$    | 40                            | 2 M             | 38.5               | [20]   |
| TiN nanowires       | 1800                          | 1 M             | 117.5              | [18]   |
| TiN nanosheet       | 500                           | 1 M             | 81.6               | This work |

$^a$ The TiN sample is powder. Thus, each electrode was made by mixing the TiN sample, acetylene black and polytetrafluoroethylene (PTFE), and then by coating a Ni foam.