Electronic Supplementary Information

Chemicals:

Titanium Nitride (99.9%, 20 nm) was purchased from Aladdin and used as received. Nitric acid (69%) and Ethanol absolute were purchased from VWR chemical co. LTD. Sulfur sublimed (99.5%, 100 mesh) was purchased from Alfa Aesar co. LTD. MWCNT (Thin, 95+%, Nanocyl-3100) was purchased from Nanocyl co LTD. All of the reagents were at analytical grade and used without further purification. The deionized water was produced from an ultrapure water system (Mili-QUF Plus) and used throughout the whole experiment.

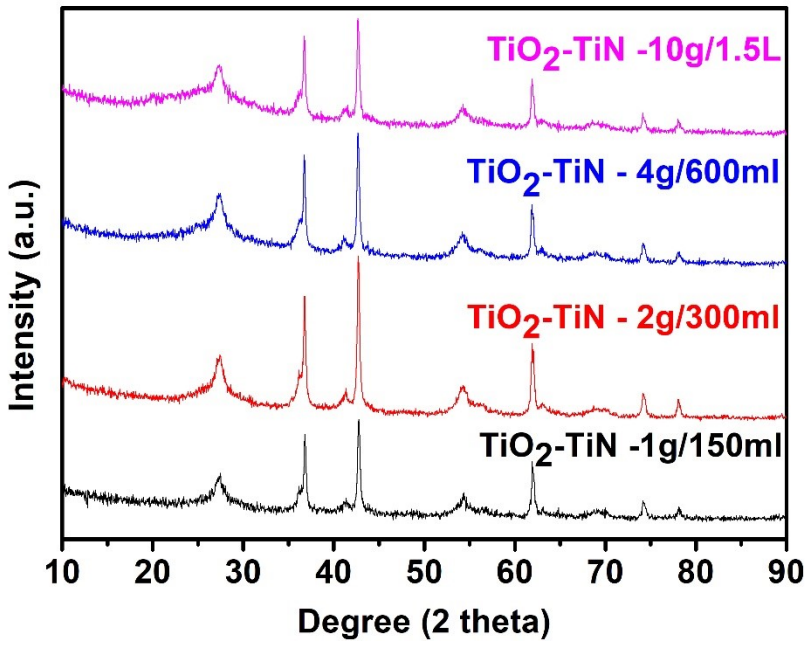

Fig. S1. XRD patterns of TiO_2-TiN composites synthesized at different scales.

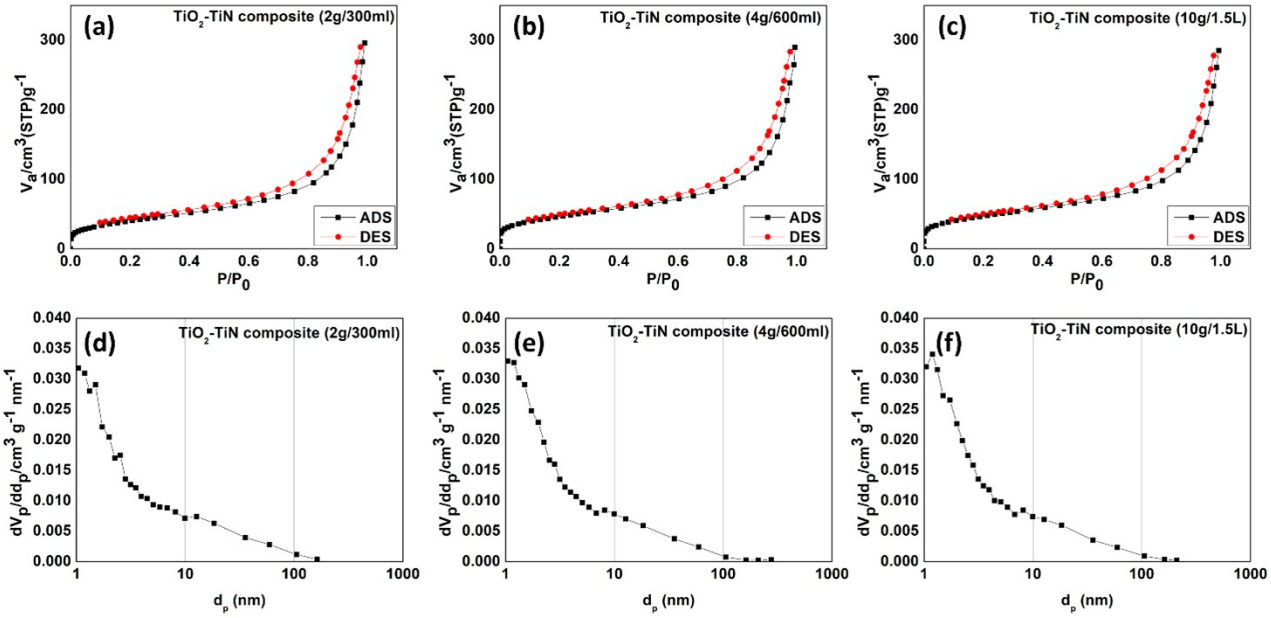

Fig. S2. Comparative nitrogen adsorption-desorption isotherms and BJH plots for TiO_2-TiN composites at various production scales

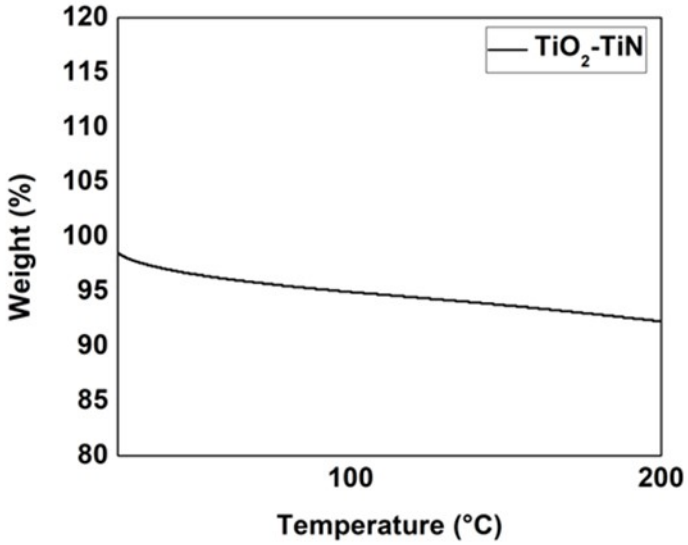

Fig. S3. TGA curves for TiO_2-TiN composite.

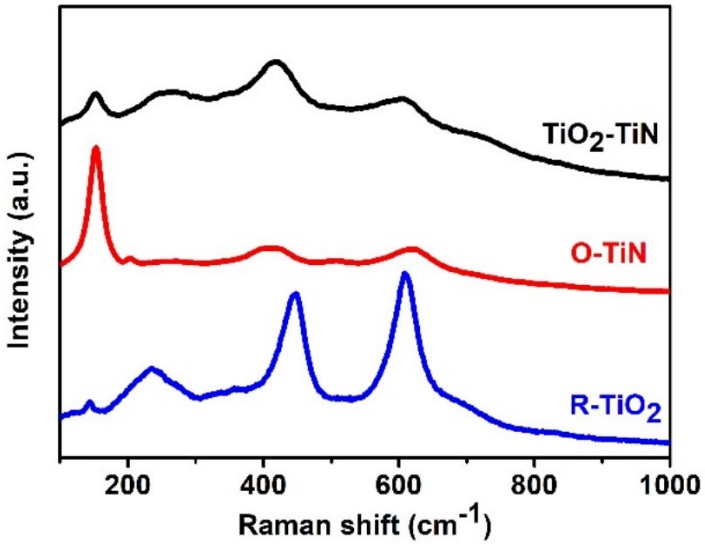

Fig. S4. Raman shift of TiO_2-TiN composite, O-TiN and R-TiO_2

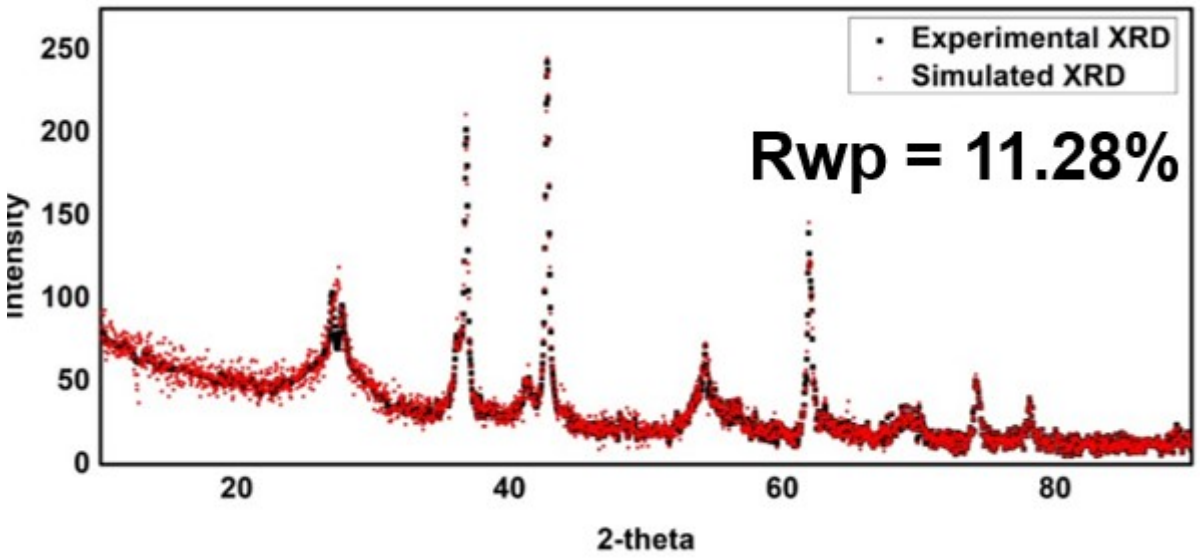

Fig. S5. Comparison between the experimental XRD pattern and simulated XRD pattern.

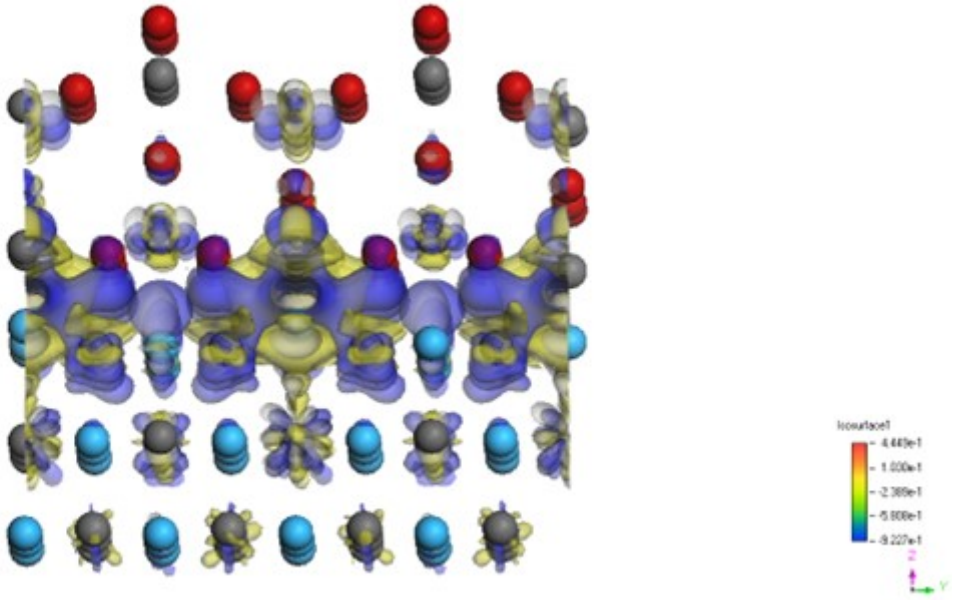

Fig. S6. EDD results of TiO2-TiN composite

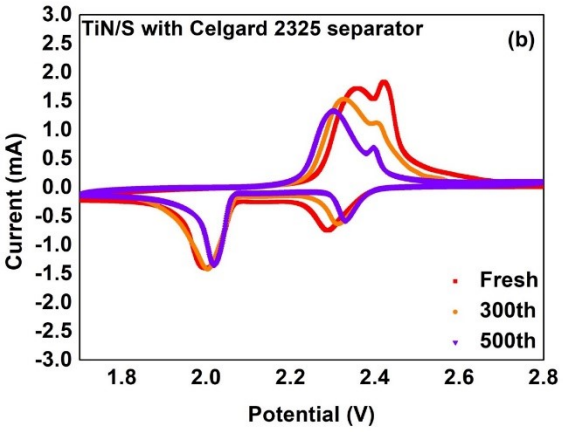

Fig. S7. CV curves of TiN/S battery with Celgard 2325 separator

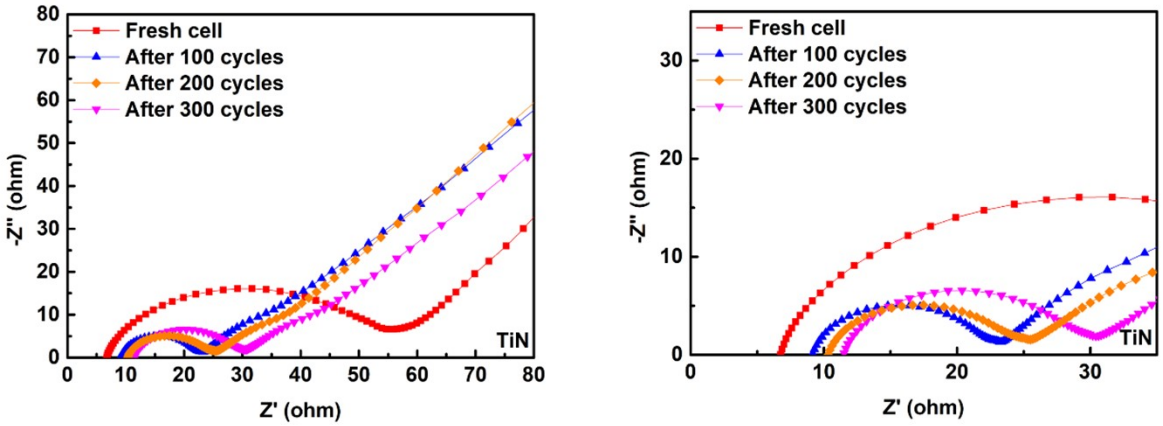

Fig. S8. Nyquist plots of TiN/S battery with Celgard 2325 separator