Supporting information

Design and Synthesis of Novel Pomegranate-Like TiN@MXene Microspheres as Efficient Sulfur Hosts for Advanced Lithium Sulfur batteries

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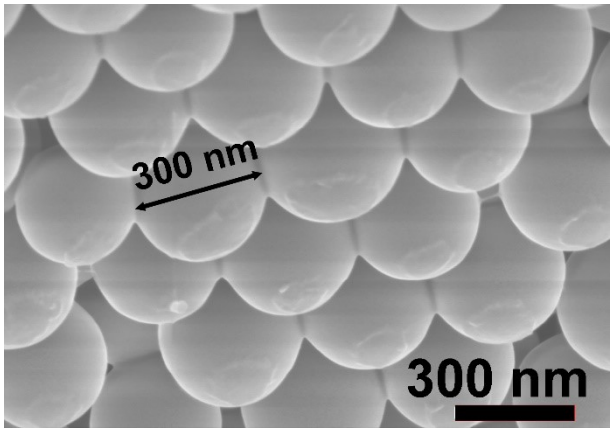

Fig. S1 SEM image of sPS spheres.

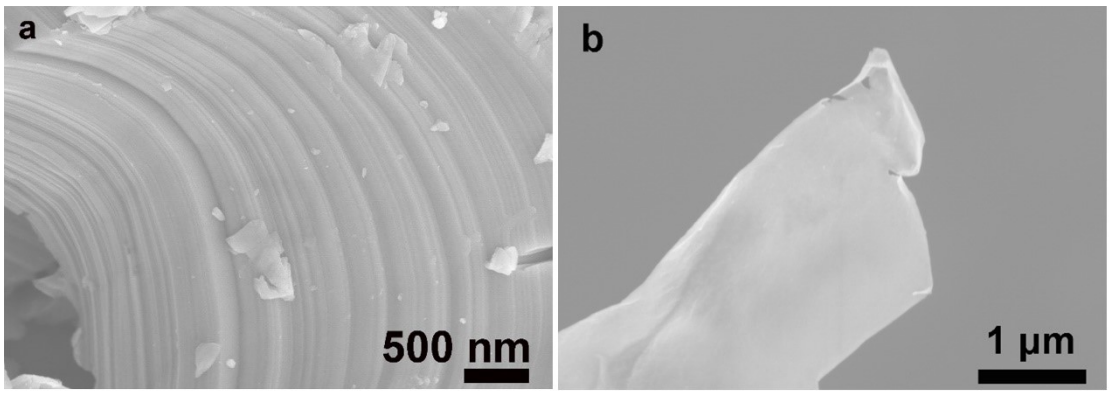

Fig. S2 SEM images of (a) MAX and (b) Ti_3C_2 MXene.

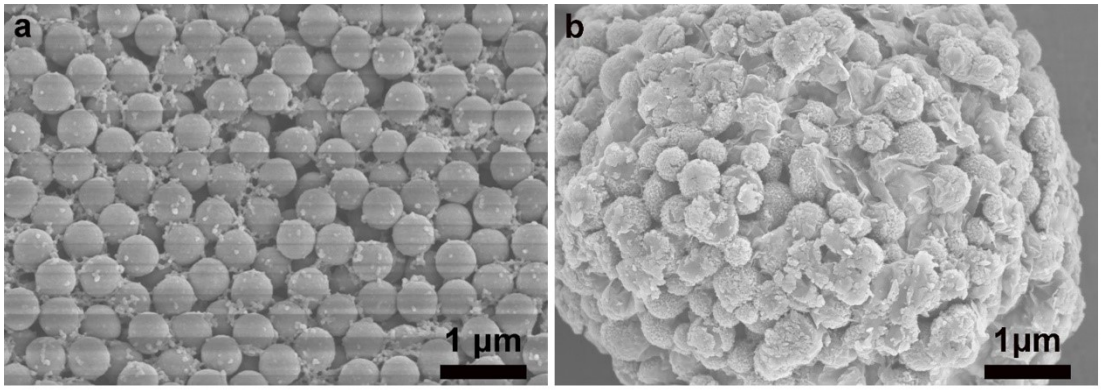

Fig. S3 SEM images of (a) sPS@TiO_2 and (b) sPS@TiO_2@MXene.

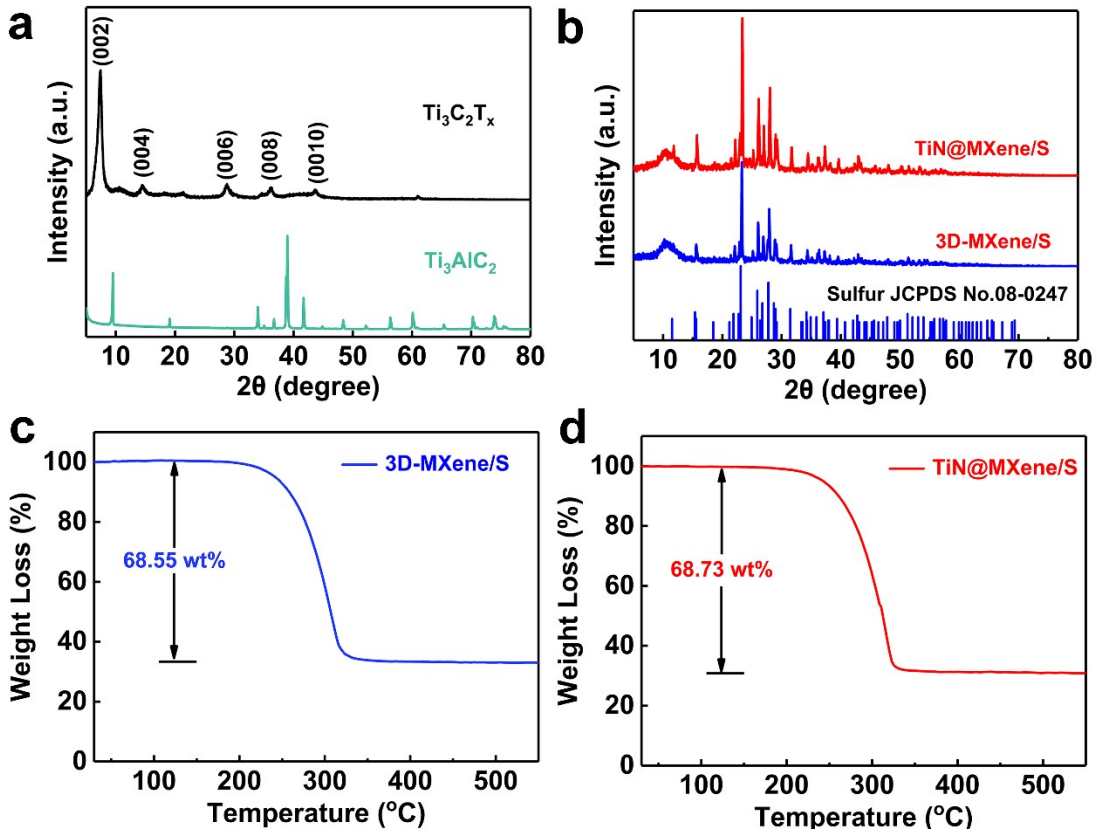

Fig. S4 (a, b) XRD patterns of the samples in synthesis experiments. (c, d) TG curves of the 3D-MXene/S and TiN@MXene/S composites.

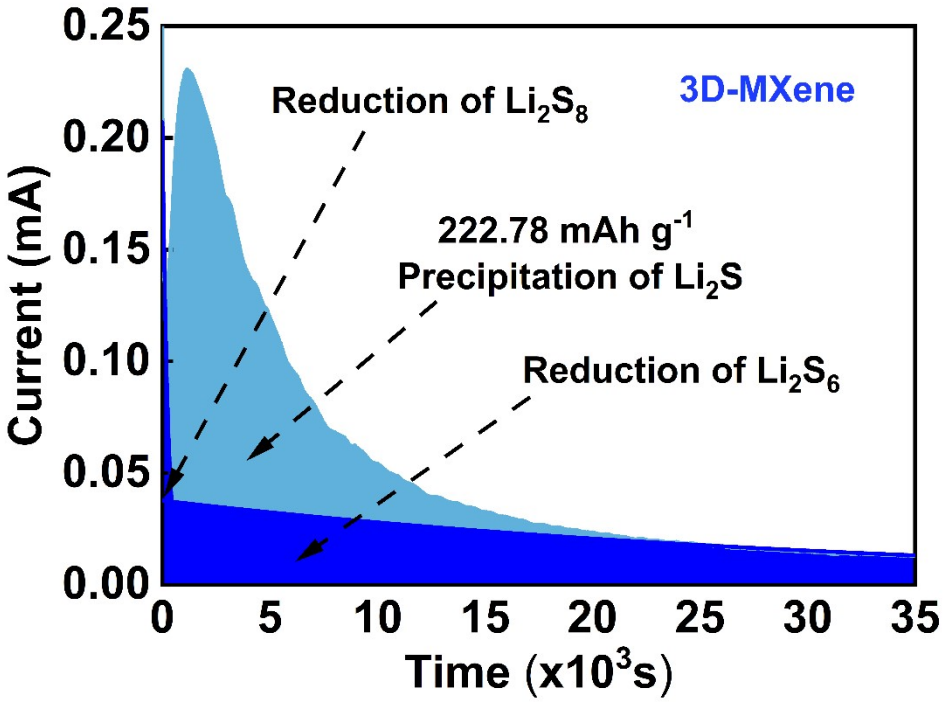

Fig. S5 Constant potential discharge curve of the Li_2S deposition tests using 3D-MXene as substrate.

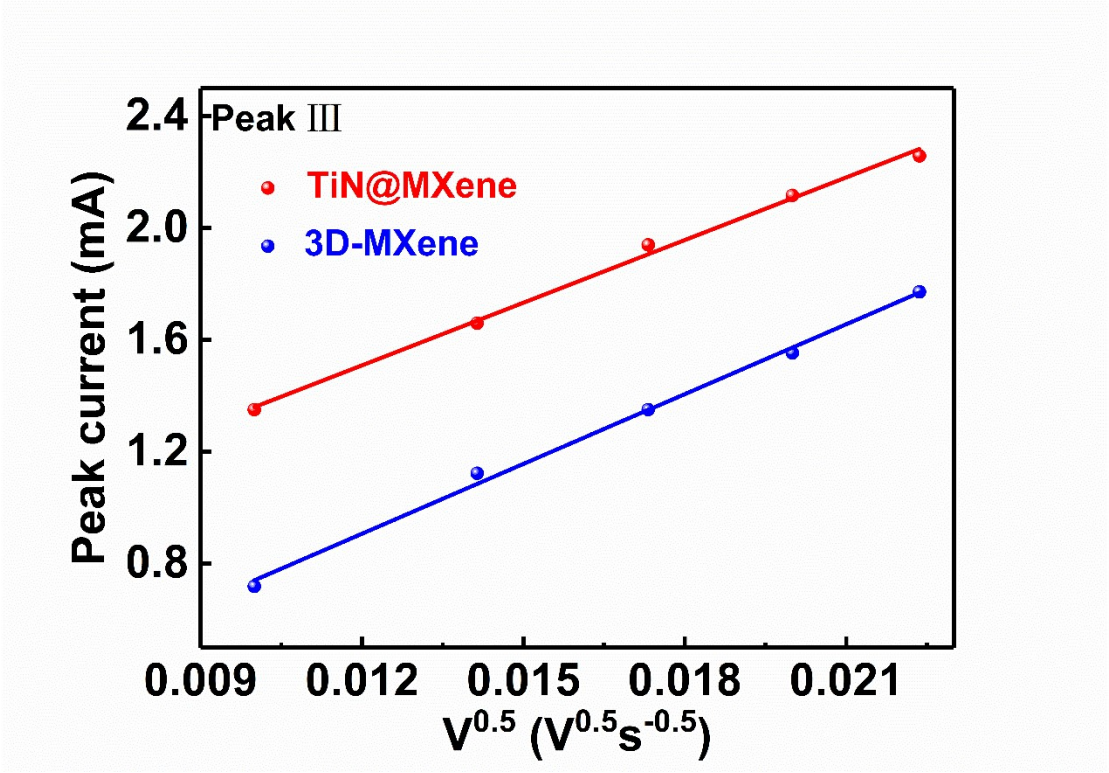

Fig. S6 The Li^+ diffusion coefficient values of the TiN@MXene and 3D-MXene cathodes for the processes represented by peak III.

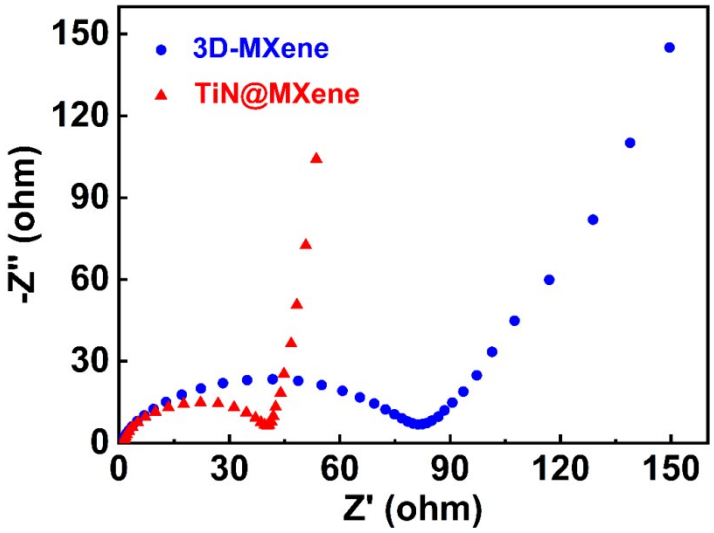

Fig. S7 EIS spectra of the 3D-MXene and TiN@MXene cathodes.

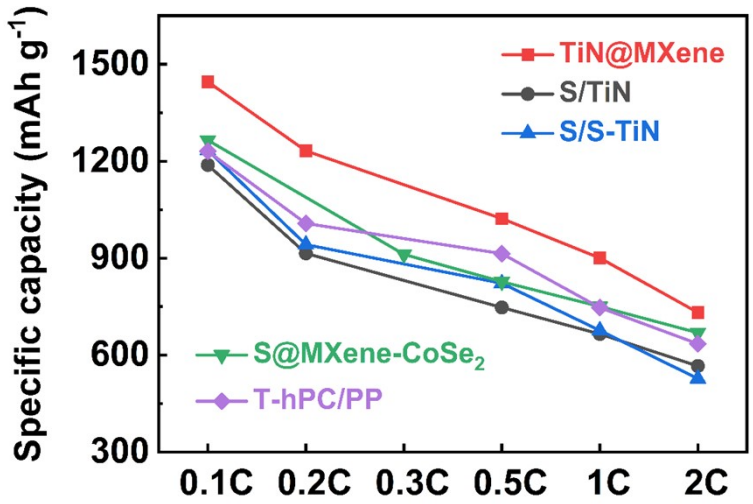

Fig. S8 The rate performance of TiN@MXene cathode was compared with some reported cathodes based on TiN or some other catalytic materials.

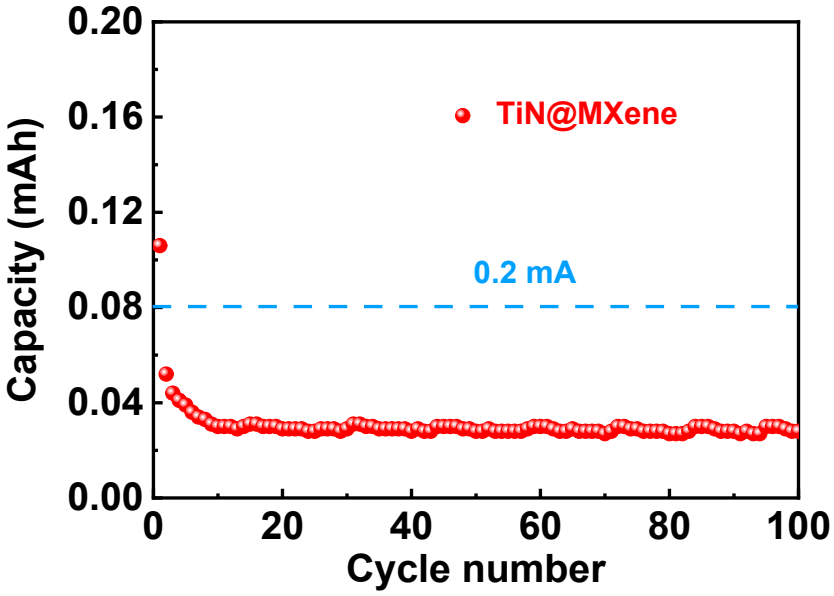

Fig. S9 Cycling performance of TiN@MXene based cathode half-cell at 0.2 mA.

Table S1. Summary of D_{Li} values at peaks I, II, III for 3D-MXene and TiN@MXene cathodes.

CV Peak	TiN@MXene	3D-MXene
Peak I	8.72×10^{-9} cm^2 s^{-1}	3.40×10^{-9} cm^2 s^{-1}
Peak II	6.73×10^{-9} cm^2 s^{-1}	1.68×10^{-9} cm^2 s^{-1}
Peak III	3.18×10^{-8} cm^2 s^{-1}	2.23×10^{-8} cm^2 s^{-1}