

## ESI

### Electrodeposition of 2D layered tungsten diselenide thin films using a single source precursor

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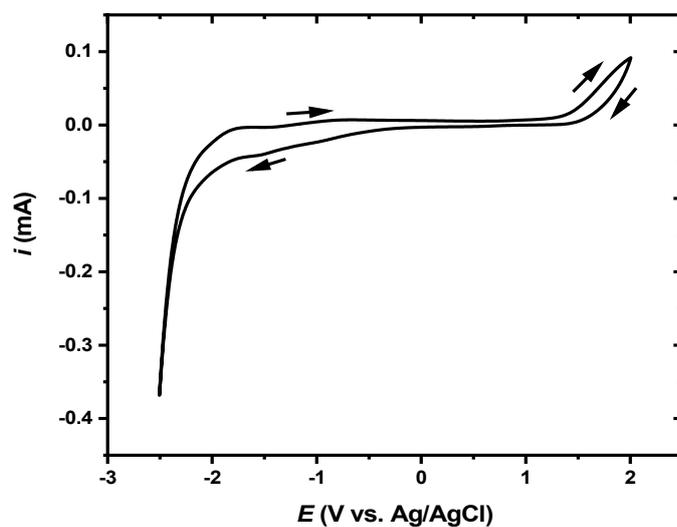


Fig. S1 Cyclic voltammogram of the supporting electrolyte (0.1 M [Et<sub>4</sub>N]Cl in MeCN) on a TiN electrode. The scan rate is 50 mV s<sup>-1</sup>. Arrows indicate the direction of potential scanning; the starting potential is 0 V.

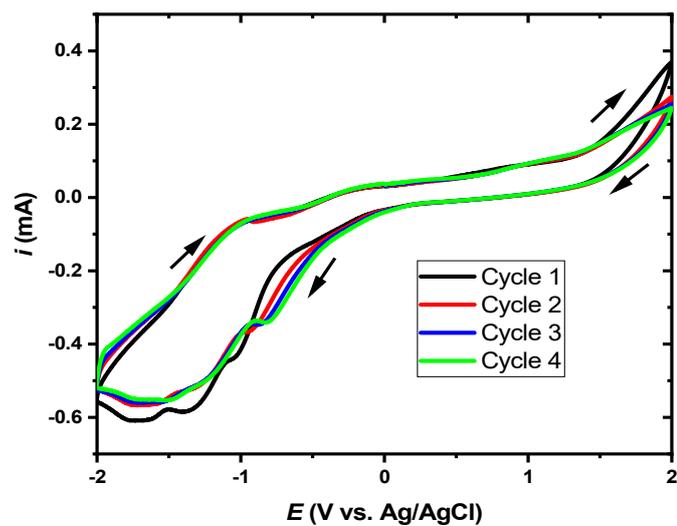


Fig. S2 Multiple scans of the cyclic voltammogram of 5 mM  $\text{WSeCl}_4$  in MeCN on TiN electrode. The supporting electrolyte is 0.1M  $[\text{Et}_4\text{N}]\text{Cl}$  and the scan rate is  $50 \text{ mV s}^{-1}$ . Arrows indicate the direction of potential scanning; the starting potential is 0 V.

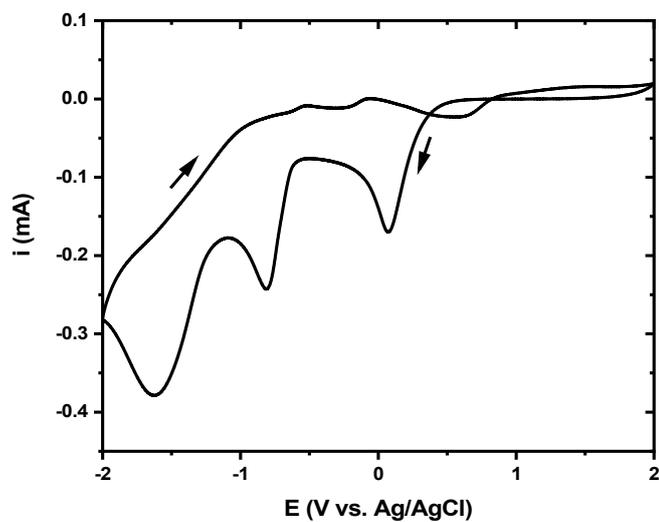


Fig. S3 Cyclic voltammogram of 5 mM  $\text{WCl}_6$  in MeCN on a TiN electrode. The supporting electrolyte is 0.1 M  $[\text{Et}_4\text{N}]\text{Cl}$  and the scan rate is  $50 \text{ mV s}^{-1}$ . Arrows indicate the direction of potential scanning; the starting potential is 0 V.



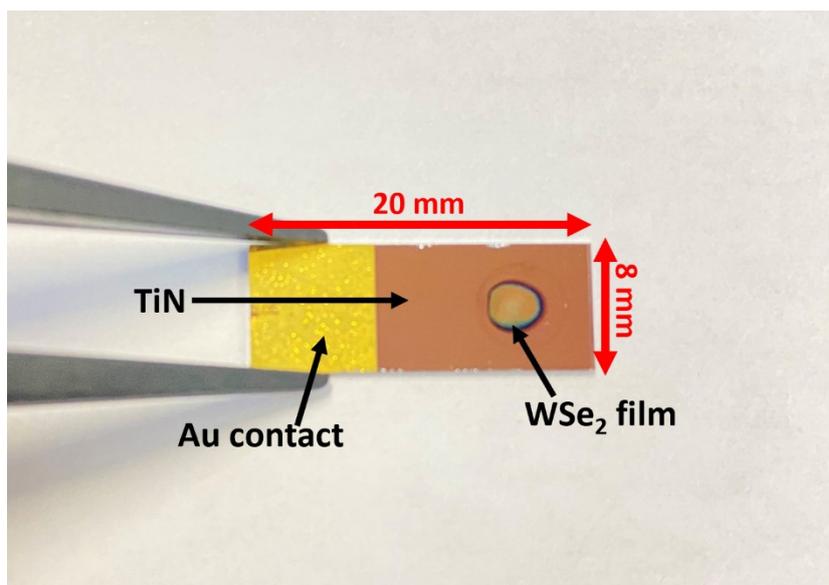


Fig. S4 Photograph of the TiN electrode after electrodeposition showing the area where WSe<sub>2</sub> is electrodeposited. The TiN substrate is placed inside a sealed container to ensure that WSe<sub>2</sub> is deposited only within the pre-defined circular area (0.4 cm diameter).

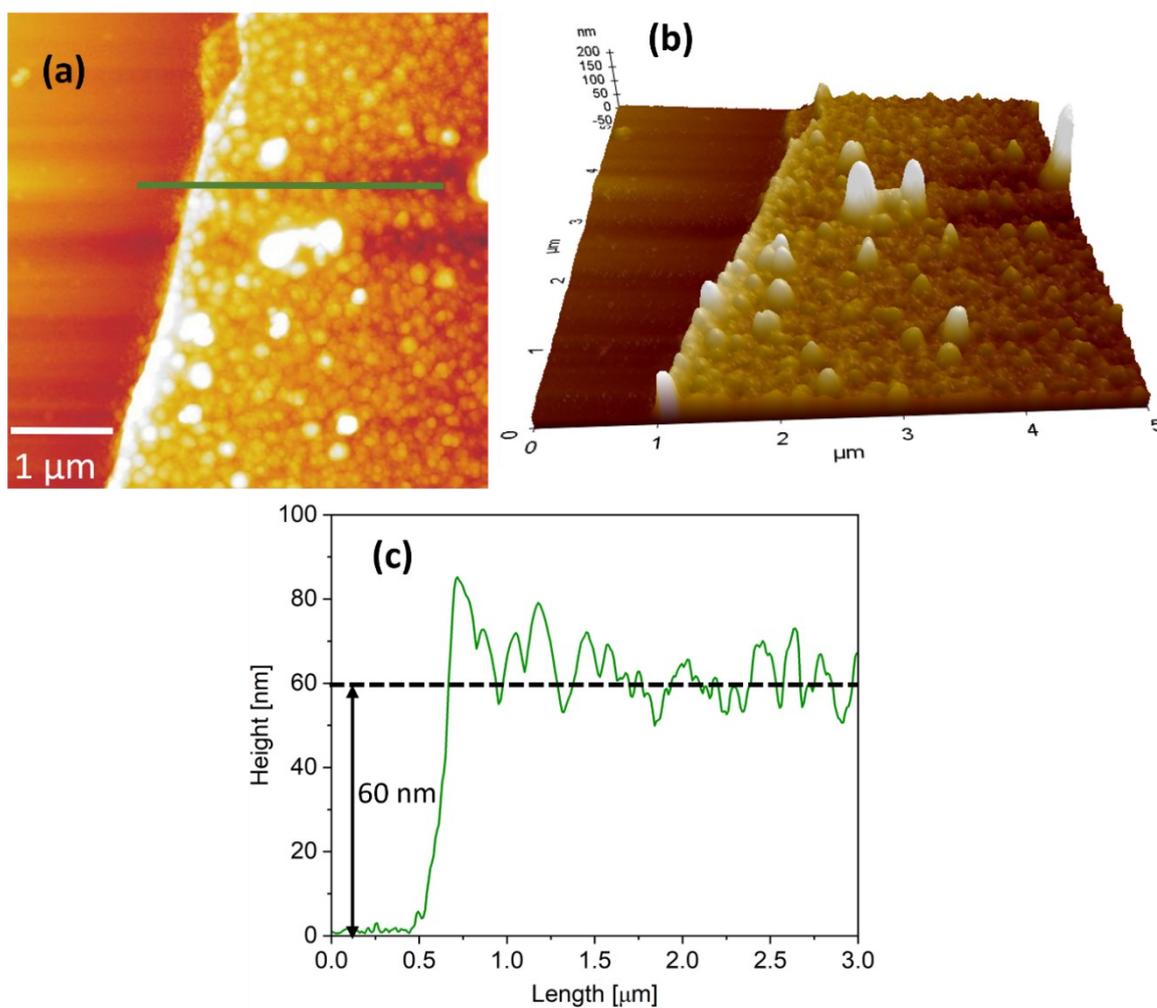


Fig. S5 (a) AFM topography image of a WSe<sub>2</sub> thin film deposited on TiN electrode, (b) 3D scan AFM image of the thin film, (c) height profile extracted from the AFM image.

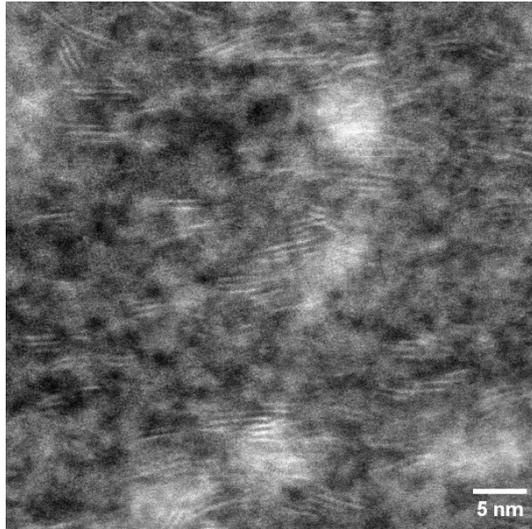


Fig. S6 Cross-sectional annular dark-field STEM image of the as-deposited WSe<sub>2</sub> thin film.