

Supporting Information for

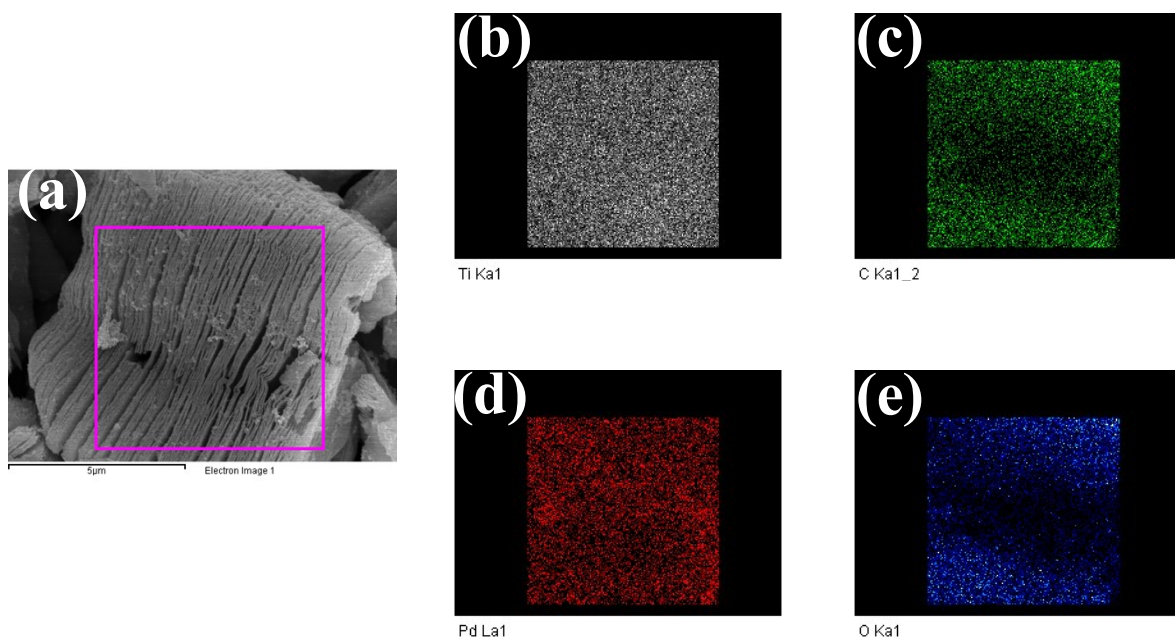
**Palladium Nanoparticles-Decorated Multi-layer  $Ti_3C_2T_x$   
Dual-Functioning as Highly Sensitive Hydrogen Gas Sensor  
and Hydrogen Storage**

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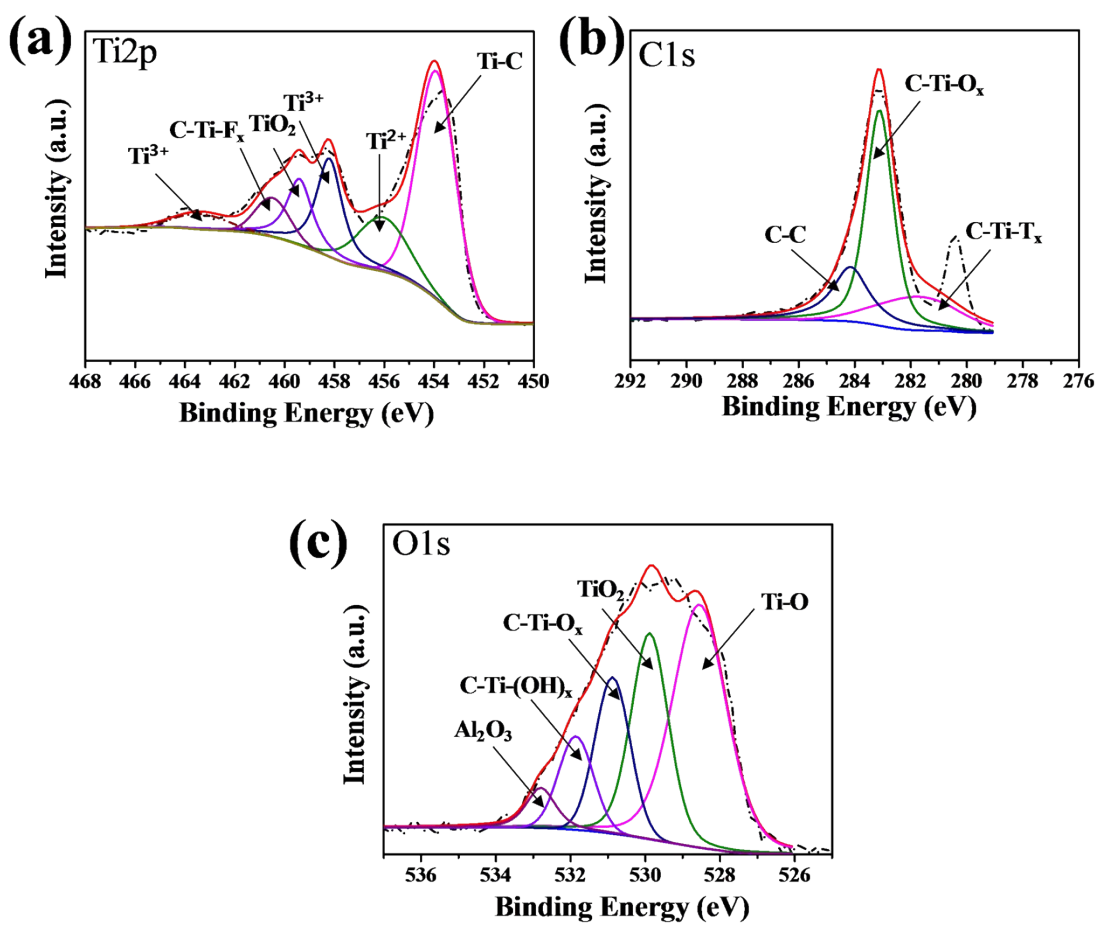
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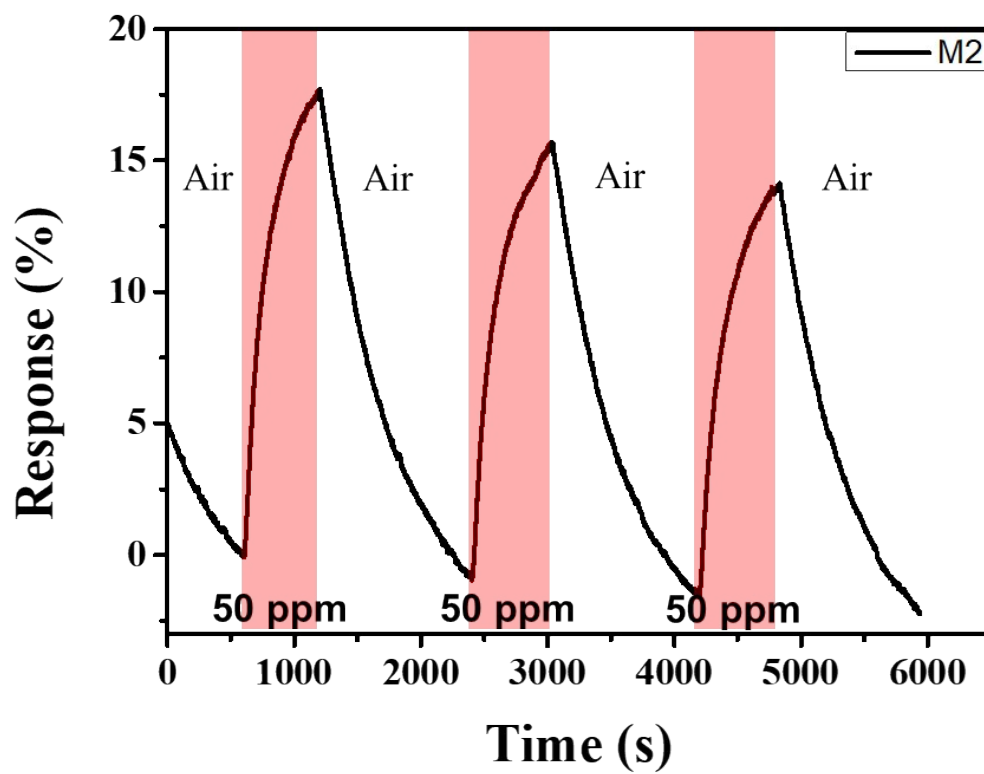
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**Figure S1.** (a) SEM image of a Pd-Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> nanocomposite (M2). SEM-EDX elemental maps of (b) Ti, (c) C, (d) Pd, and (e) O.



**Figure S2.** XPS spectra of ML- $\text{Ti}_3\text{C}_2\text{T}_x$  focused on (a) Ti, (b) C, and (c) O.



**Figure S3.** Cyclic responses of a Pd-Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> nanocomposite (M2) to a 50 ppm of H<sub>2</sub> gas after keeping it for 90 days at ambient condition.