

**Hydrogen evolution catalysis on amorphous MoS<sub>2</sub>/carbon fiber paper grown by hydrothermal Method**

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Transition metal dichalcogenides (TMDs), particularly molybdenum disulfide (MoS<sub>2</sub>), have been identified as excellent hydrogen evolution reaction (HER) catalyst for the water splitting reaction. In this work, we directly grow amorphous MoS<sub>2</sub> thin films on plasma pre-treated carbon fiber paper (PP-CFP) and electrochemically pre-treated carbon fiber paper (EP-CFP) to prepare catalyst for the HER. The amorphous films are synthesized at 200 °C by simple hydrothermal method. The MoS<sub>2</sub>/PP-CFP and MoS<sub>2</sub>/EP-CFP show more excellent cathodic current density of the HER than the crystalline MoS<sub>2</sub> catalysts. In addition, Tafel slopes of 48 and 52 mV per decade are measured for MoS<sub>2</sub>/EP-CFP and MoS<sub>2</sub>/PP-CFP, respectively, which suggests the Volmer-Heyrovsky mechanism of hydrogen evolution. Furthermore both samples exhibit so excellent stability that cathodic current density slightly decreases after 1000 cycles of the HER experiment.