Facile synthesis of modified 1T MoS2 nanosheets for high electrocatalytic performance

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Electrocatalysis plays a key role in the clean and sustainable energy transition. To achieve efficient hydrogen production through water splitting, an active, robust, and low-cost catalyst is highly desired. MoS2 is considered a promising candidate for hydrogen evolution reaction to replace traditional rare metal catalysts. Among the different phases of MoS2, the metallic 1T type has been found to be superior to the 2H type in terms of catalytic activity and electron conductivity.

In this work, we will present a facile approach to fabricating 1T-dominated MoS2 nanosheets through hydrazine intercalation, which can be easily grown on carbon paper at a large scale.[1, 2] In addition, vanadium doping significantly improves its catalytic performance. The intercalated 1T type MoS2 nanosheets with 5 % V doping exhibit more than a 10-fold increase in current density compared with its 2H type analogue. Moreover, the modified 1T MoS2 nanosheets show excellent stability in both acidic and alkaline solutions. This work may shed some light on the design of new electrocatalysts to make hydrogen a more accessible energy source in future.

Figure 1 Hydrothermal synthesis process of 1T dominated MoS2 nanosheets with hydrazine intercalation and vanadium doping.

Reference


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