

TMDCs stacked layers by chemical approach

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Abstract

Since the isolation of graphene from graphite, tremendous efforts have been directed to the fabrication of heterostructures based on other two-dimensional (2D) materials.[1] In this scenario, the large family of transition metal dichalcogenides (TMDCs), whose members meet the general formula MX_2 (where M represents a transition metal, and X stands for a chalcogenide, such as S, Se or Te), deserves special attention.[2] In this work, we have synthesized a new composite based on chemically exfoliated MoS_2 flakes and a tungsten-based cluster $[\text{W}_3\text{S}_4(\text{tu})_8(\text{H}_2\text{O})]^{4+}$ [3] (tu = thiourea) that permits to obtain WS_2/MoS_2 stacked layers via controlled calcination. This represents an easy process for large scale production of stacked layers while keeping close adhesion between the 2D units. The potential HER activity of the intermediate material will be also discussed.

References

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Figures

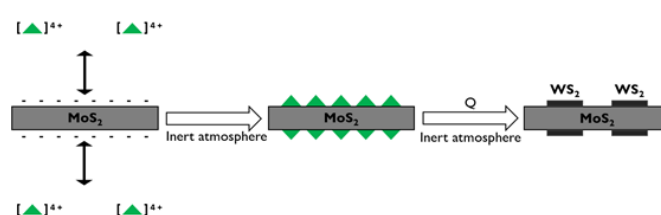


Figure 1: Artistic representation of the synthesis of WS_2/MoS_2 stacked layers using MoS_2 flakes functionalized with the tungsten-containing cluster as a precursor.