Preparation and Application of Novel Transition Metal Dichalcogenides Nanomaterials

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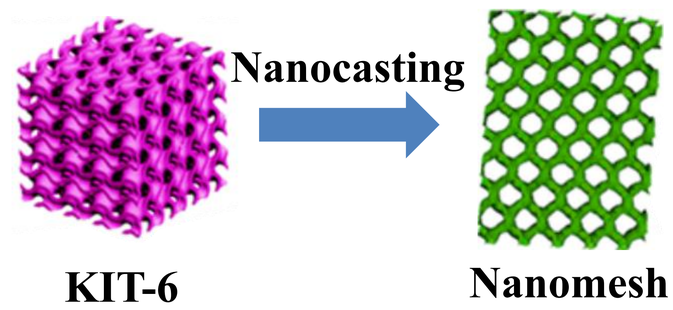
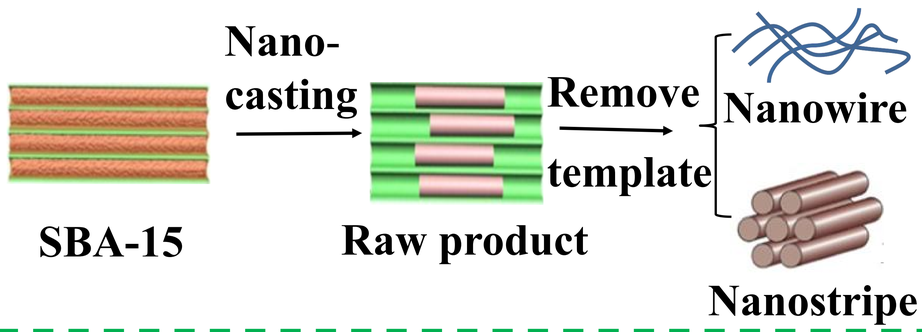
Background

Transition metal dichalcogenides (TMDs) have drawn greatly much interest owing to their interesting physical properties and promising potential application. But there are some great challenges to the synthesis of TMDs nanomaterial:

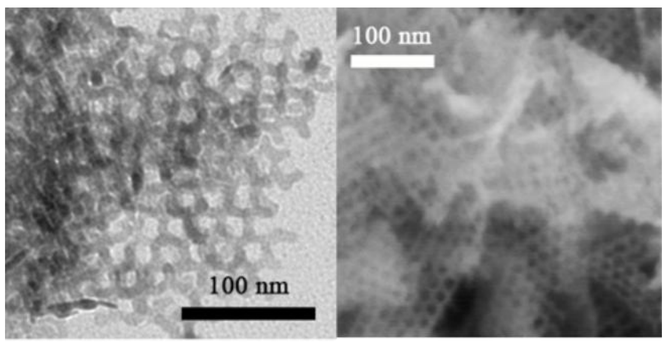
1. Random morphology
2. Thickness asymmetry
3. Poor lattice quality

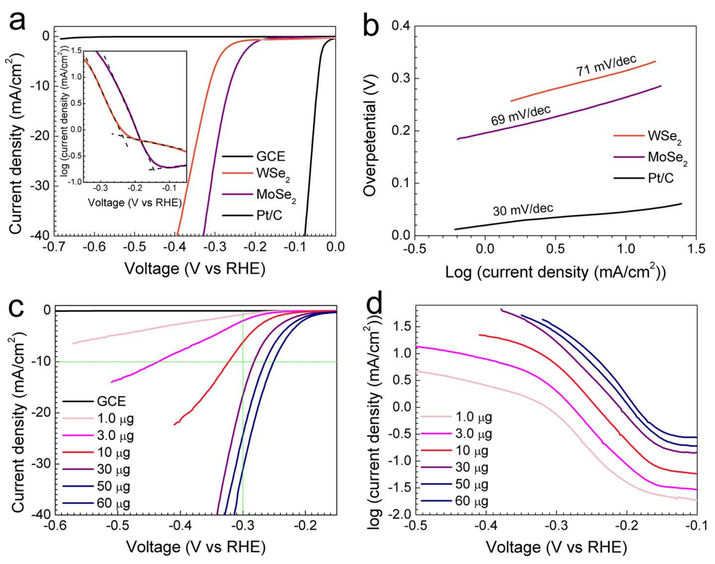
Stratagem



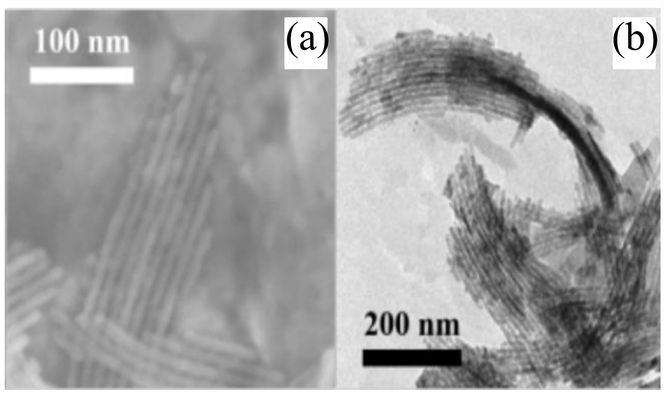


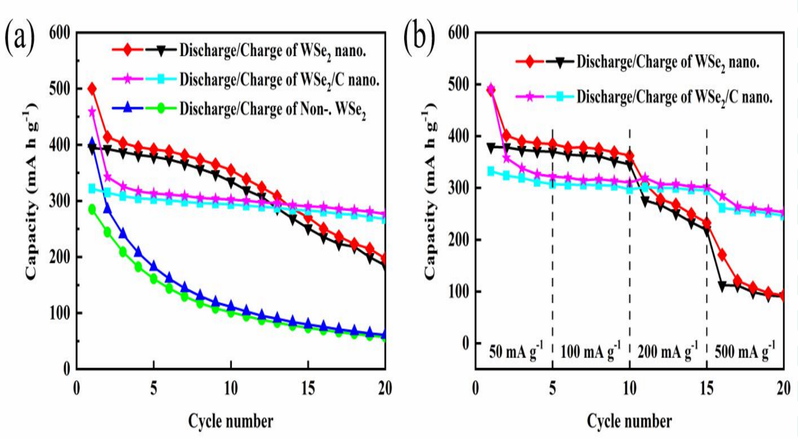
$MoSe_2$ nanomesh



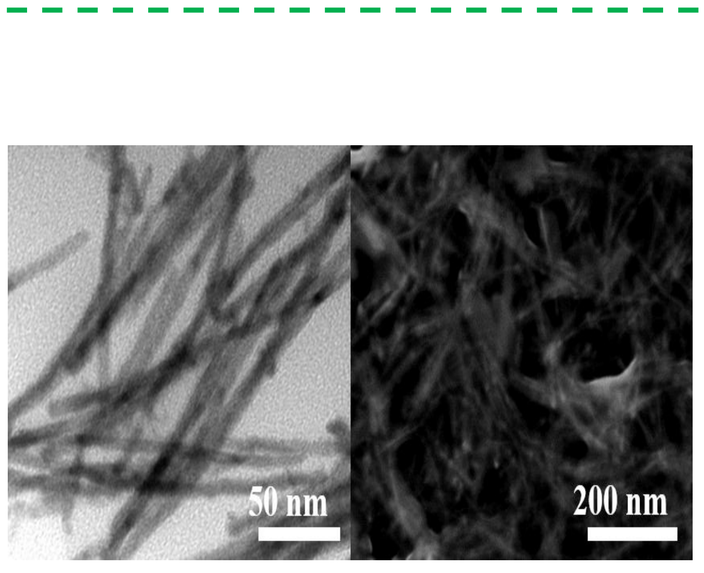


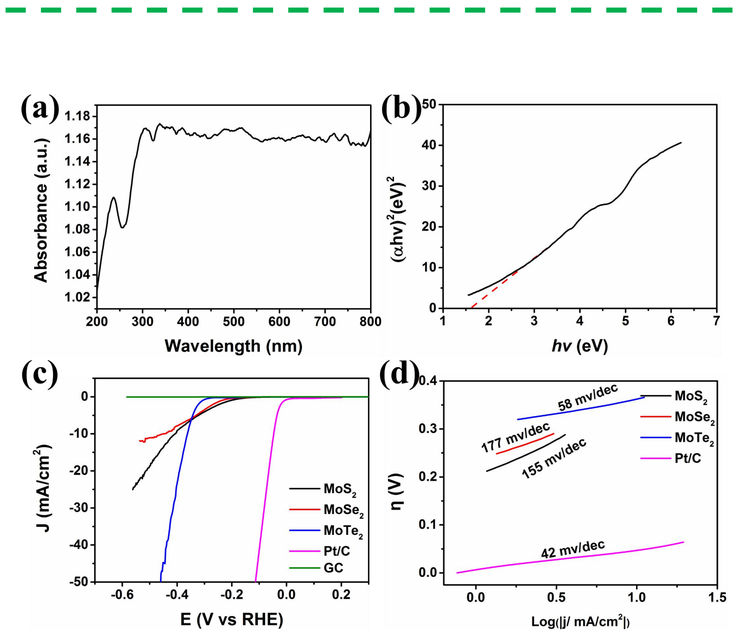
WSe_2/C nanostripe array





$MoTe_2$ nanowire





Conclusion

The formation of this special structure should be attributed to the synergistic effect from the crystal self-limitation growth that is caused by their layered crystal structures and the space-limitation effect coming from the unique pore structure of the KIT-6/SBA-15 template. The special structure brings these TMDs nanomaterials extremely high exposure of layer edges. The high layer edge exposure ratio has improved the performance of TMDs in some fields, such as hydrogen revolution reaction (HER) and batteries.

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