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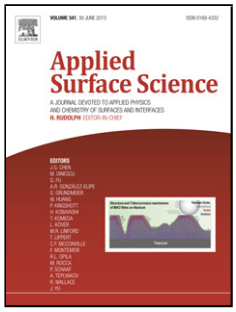

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Authors: Binjie Zheng, Zegao Wang, Fei Qi, Xinqiang Wang, Bo Yu, Wanli Zhang, Yuanfu Chen

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CVD growth of large-area and high-quality HfS_2 nanoforest on diverse substrates

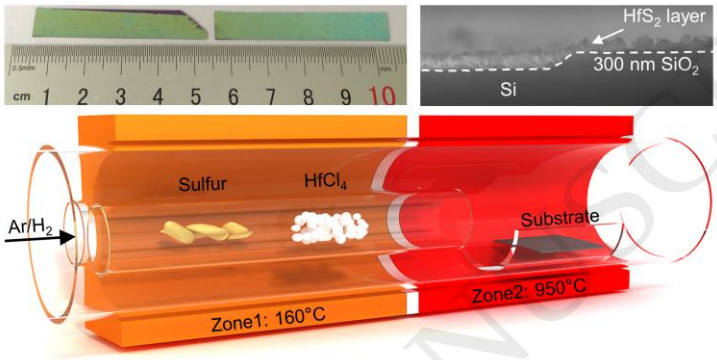
Binjie Zheng[a], Zegao Wang[b]*, Fei Qi[a], Xinqiang Wang[a], Bo Yu[a], Wanli Zhang[a], Yuanfu Chen[a]*

[a] State Key Laboratory of Electronic Thin Films and Integrated Devices, University of Electronic Science and Technology of China, Chengdu 610054, P. R. China

[b] Interdisciplinary Nanoscience Center, Aarhus University (iNANO), DK-8000 Aarhus C, Denmark

E-mail address: wangzegao@gmail.com (Z. Wang), yfchen@uestc.edu.cn (Y. Chen).

Graphical abstract



Highlights

- Inch-size HfS_2 nanoforest was synthesized via chemical vapor deposition (CVD).
- HfS_2 nanoforest can be grown on diverse substrates from insulator to conductor.
- HfS_2 nanoforest is constructed with vertical few-layer HfS_2 nanosheets of quality.
- HfS_2 nanoforest owns abundant exposed edge sites and large active surface area.

Abstract

Two-dimensional layered transition metal dichalcogenides (TMDs) have attracted burgeoning attention due to their various properties and wide potential applications. As a new TMD, hafnium disulfide (HfS_2) is theoretically predicted to have better electrical performance than widely studied MoS_2. The experimental researches also confirmed the extraordinary feature in electronics and optoelectronics. However, the maximal device performance may not be achieved due to its own limitation of planar structure and challenge of transfer without contamination. Here, through the chemical vapor deposition