Xueping Cui
(Jian Zheng)
Institute of Chemistry Chinese Academy of Sciences, Zhongguancun North First Street 2,100190, Beijing, China
cuixueping@iccas.ac.cn

Fabrication of Transition Metal Dichalcogenides Nanoscrolls

Abstract
Atomically thin transition metal dichalcogenides (TMD) flakes were believed capable to scroll into nanoscrolls (NS) with distinct properties. However, limited by mechanical strength and chemical stability, production of high-quality transition metal dichalcogenides nanoscrolls remain challenging. Here, we demonstrated high-quality nanoscrolls made from chemical vapour deposition-grown transition metal dichalcogenides flakes. Based on the internal open topology, nanoscrolls hybridized with a variety of functional materials have been fabricated, which is expected to confer transition metal dichalcogenides nanoscrolls with additional properties and functions attractive for potential application.

References

[1] Xueping Cui, Jian Zheng*, et al. Nature Commun. 9(2018),1301.

Figures

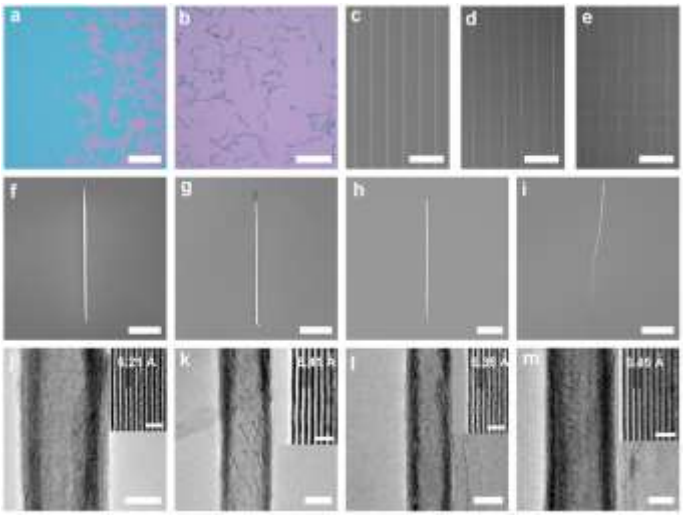

Figure 1: TMD-NSs from self-scrolling CVD-based TMD monolayer flakes. a, Optical image of CVD-grown MoS2 monolayer flakes. b, Optical image of MoS2-NSs. c-e, The fabrication process of a MoS2-NS array. f-i, SEM images of typical TMD-NSs: MoS2-NSs (f),WS2-NSs (g), MoSe2-NSs (h), and WSe2-NSs (i). j-m, TEM images of typical TMD-NSs: MoS2-NSs (j),WS2-NSs (k), MoSe2-NSs (l), and WSe2-NSs (m). Inset: High-magnification images of sidewalls of TMD-NSs. (Scale bars, 500 μm in a; 100 μm in b; 50 μm in c-e; 5 μm in f, l; 10 μm in g, h; 20 nm in j-m; 2 nm in inset).