

Supporting Information

Telluride-Based Nanorods and Nanosheets: Synthesis, Evolution and Properties

Muhammad Safdar,^a Zhenxing Wang,^a Misbah Mirza,^a Faheem K.Butt,^b Yajun Wang,^a Lianfeng Sun^{*,a} and Jun He^{*,a}

^a National Center for Nanoscience and Technology, Beijing 100190, P. R. China

^b School of Material Science and Engineering, Beijing Institute of Technology, Beijing 100081, P. R. China

*To whom correspondence should be addressed: hej@nanoctr.cn, slf@nanoctr.cn

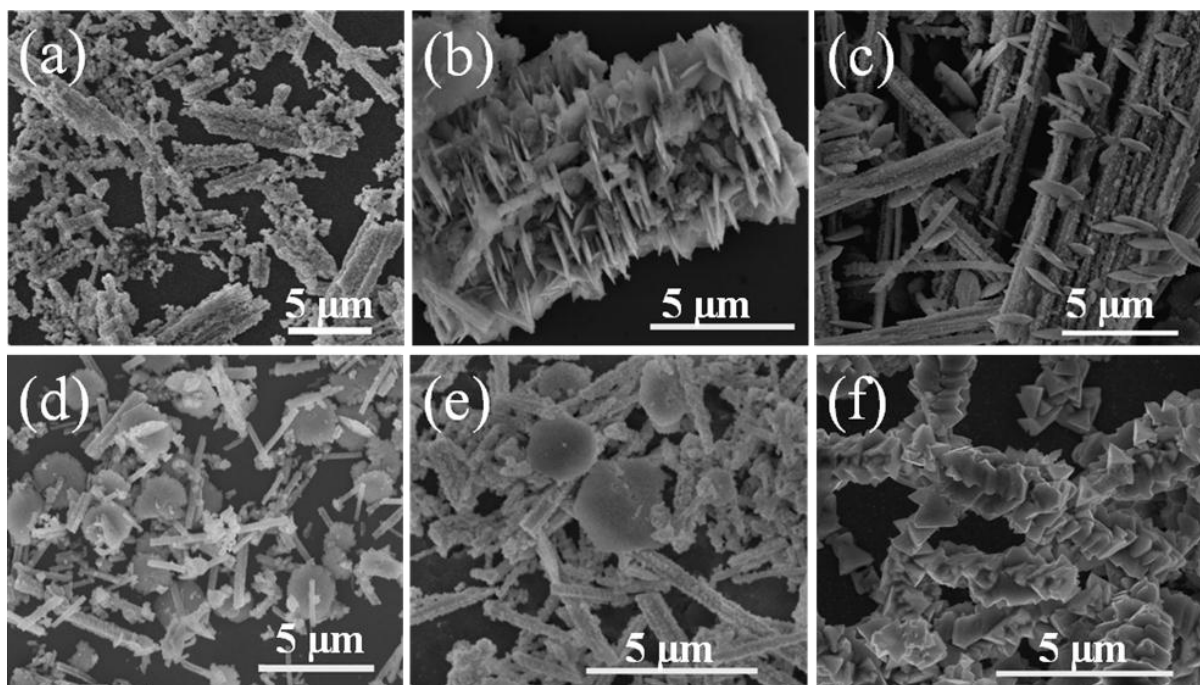


Figure S1. FESEM image (a) without PVP or CTAB, (b) PVP: CTAB with 1:0 weight ratio, (c) PVP: CTAB with 1:1 weight ratio, (d) PVP: CTAB with 1:5 weight ratio, (e) PVP: CTAB with 1:10 weight ratio, and (f) represent PVP: CTAB of with 0:1 weight ratio.

To confirm the presence of PVP is crucial for synthesis of In_2Te_3 nanoplates, we performed reaction without PVP and also replacing PVP with another surfactant CTAB. The products are obtained with

different PVP and CTAB weight ratio (PVP: CTAB, 0:1, 1:1, 1:5, 1:10 and 1:0 respectively) as shown in figure S1. The FESEM image in figure S1 (a) shows that without surfactant we get nanoparticle assisted nanorods of In_2Te_3 . The addition of PVP gives nanostring-cluster hierarchical structure of In_2Te_3 nanosheets as shown in figure S1 (b). When we added equivalent weight of CTAB of PVP (1:1 ratio), the obtained hierarchical nanostructure contain nano-prism on rod along with nanosheets as shown in figure S (c). The presence of CTAB is favorable for the triangular orientation growth of In_2Te_3 nanoparticles. [9]. Further increase in weight ratio of CTAB with PVP (1:5 and 1:10) provide more prism like nanostructure on nanorod and few nanosheet observed as shown in figure S (c) and (d). The decrease in number of nanosheets with increasing amount of CTAB comparatively to amount of PVP proves that In_2Te_3 nanosheet growth is due to capping ligand PVP. The figure S1 (f) confirmed that PVP play a vital role for In_2Te_3 nanosheets growth as there was not a single nanosheets observed in the absence of PVP (PVP: CTAB = 0:1), and only nano-prism obtained.

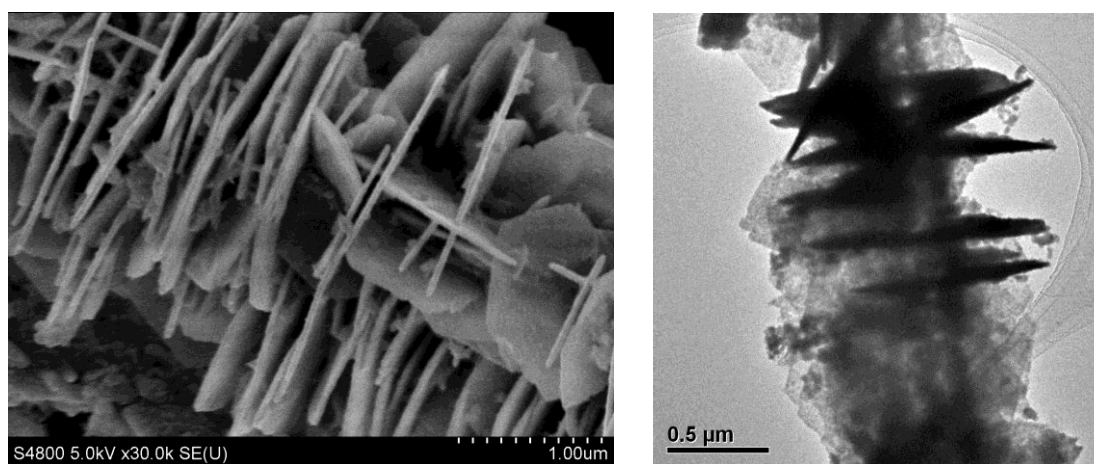


Figure S2. Side-view SEM (left) and TEM (right) images of the In_2Te_3

A proposed reaction for In_2Te_3 nanosheets is given below;

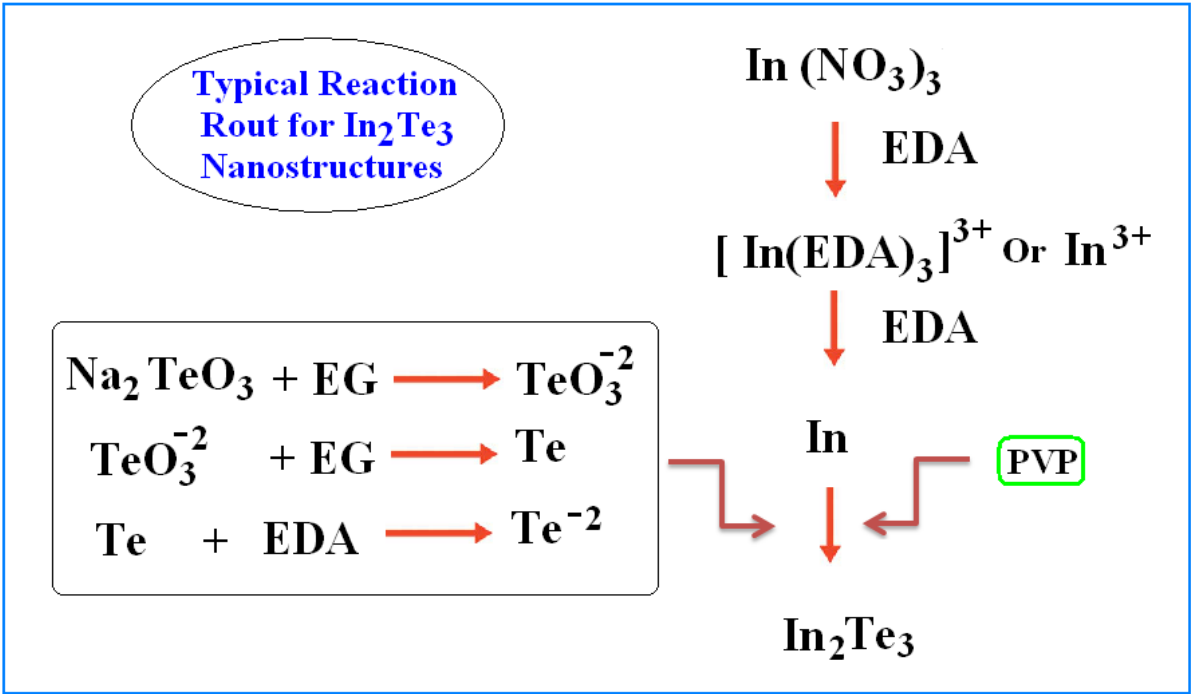


Table S 1: Comparison of hydrogen absorption of In₂Te₃ nanosheets with different other semiconductor materials.

Material	Absorption /wt%	Pressure MPa	Temp /K	Tested wt/g	Reference
In ₂ Te ₃ nanosheets	1.34	5	373	0.2	present work
In ₂ Te ₃ -Te nanosheets-nanowires	0.41	5	373	0.2	present work
Te nanowires	0.33	5	373	0.2	present work
MmNi _{4.6} Al _{0.4}	1.30	0.2	398	-	13
Zn ₃ N ₂ hollow structure	1.29	7.5	373	0.3	13
Microporous carbon	1.26	5	373	0.3	14
MoS ₂ nanotubes	1.2	3	398	0.5	14
ZnO microspheres	1.178	5	373	0.3	15
ZnO nanowires	0.83	5	373	0.3	15
BN nanotube	2.6	10	398	0.1	13