

Electronic supplementary information (ESI):

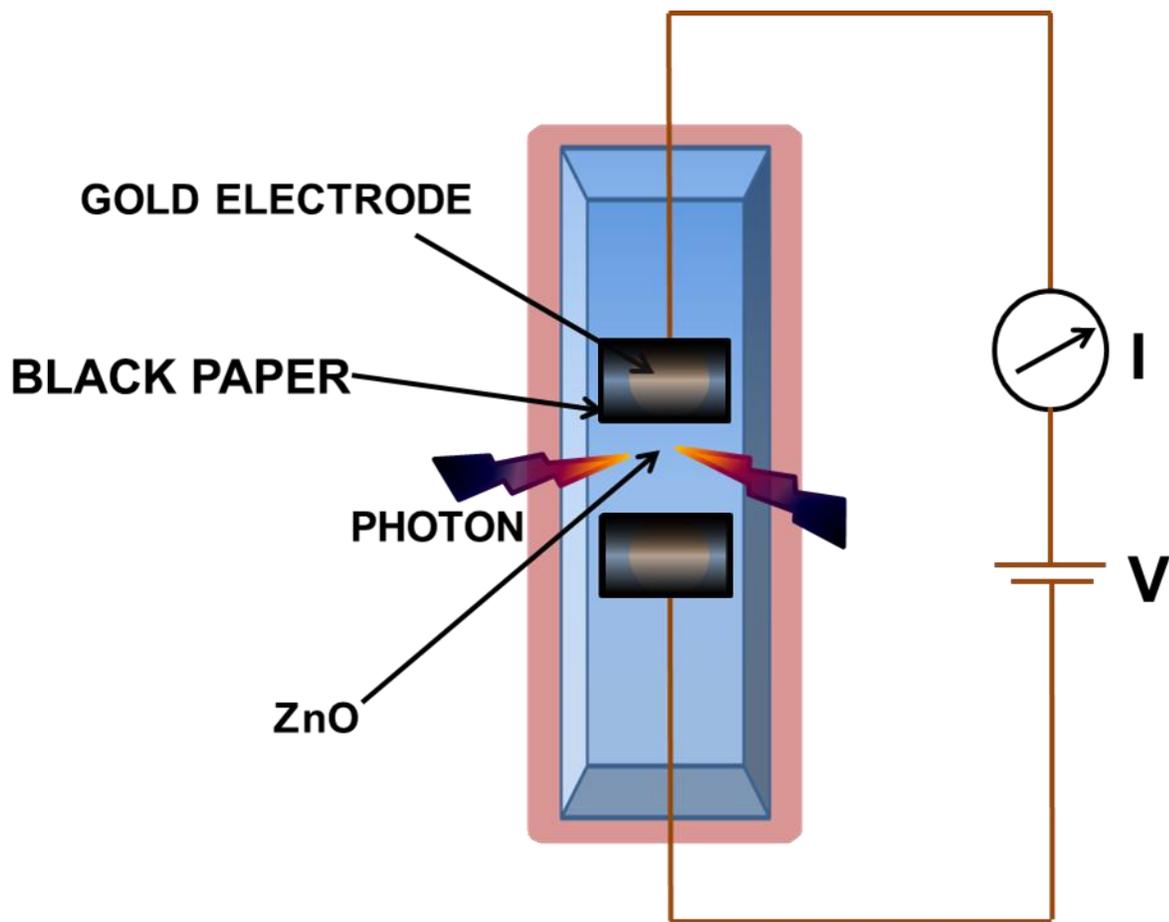


Fig. S1: Schematic arrangement for photoconductivity measurement.

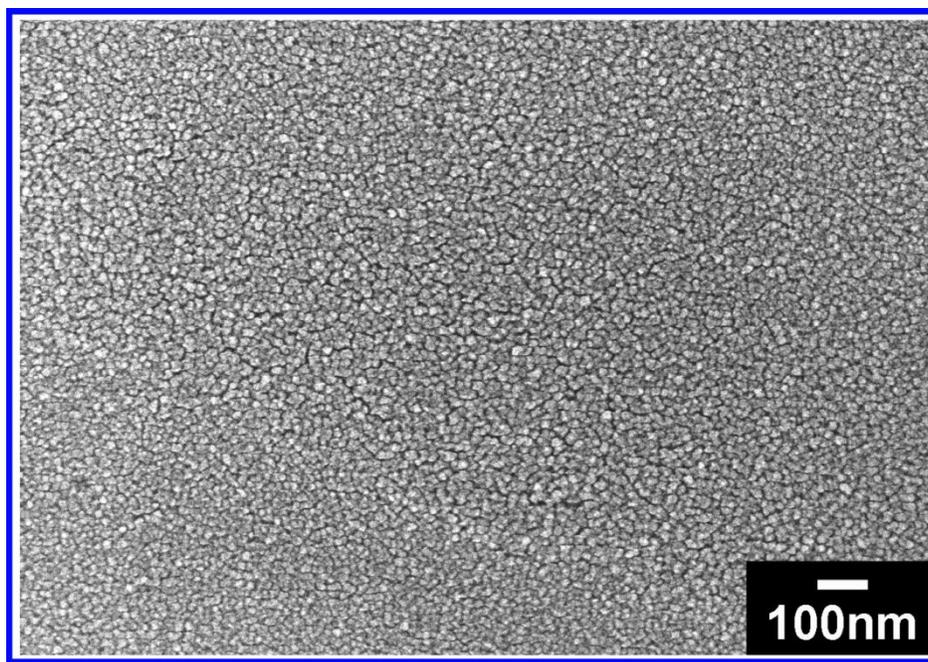


Fig. S2: FESEM image of the seeded substrate.

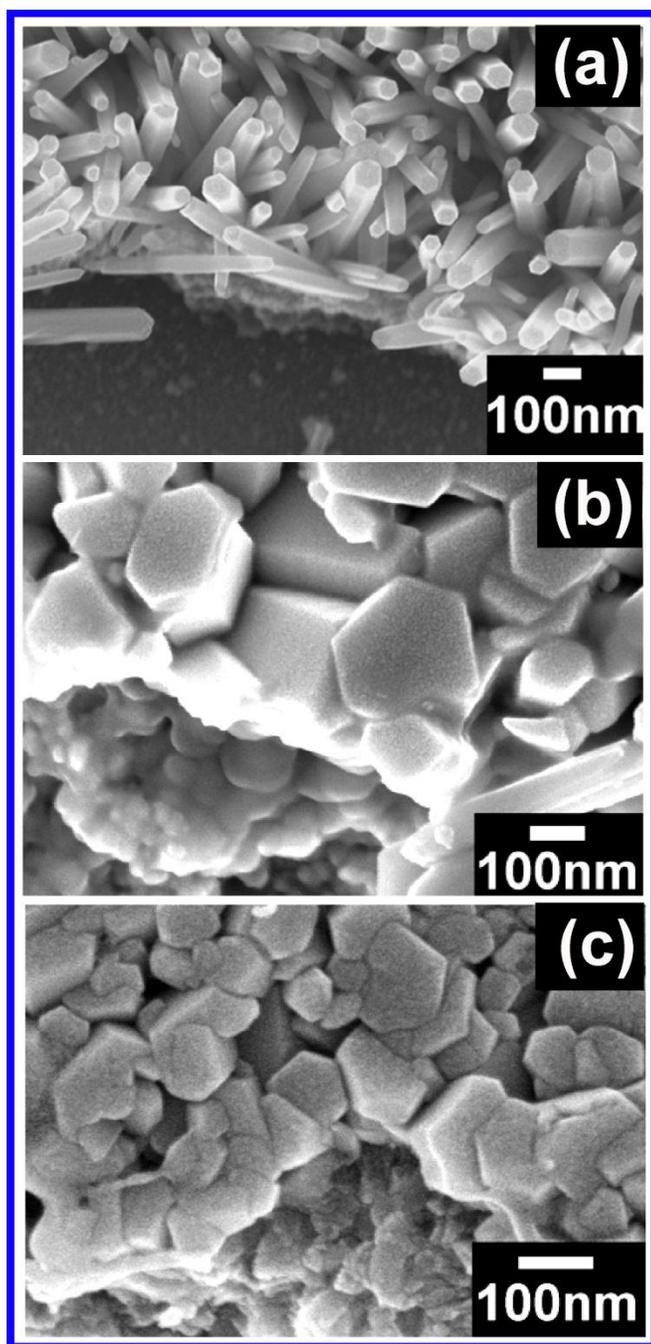


Fig. S3: cross sectional images of the samples corresponds to 90 min growth time (a) without PSS (b) with 0.06 g PSS (c) with 0.12 g.

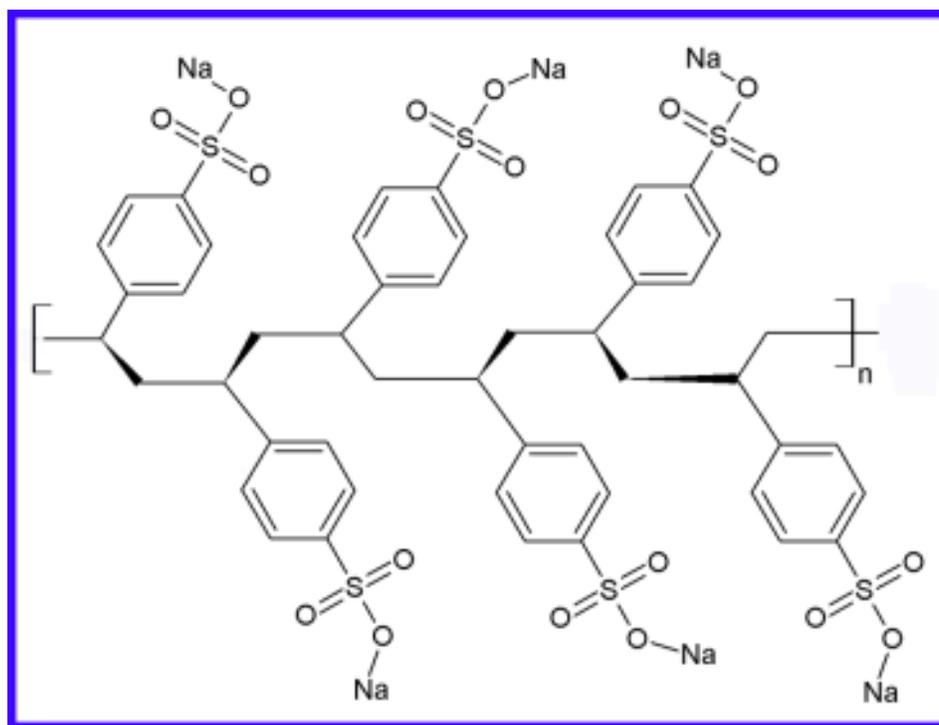
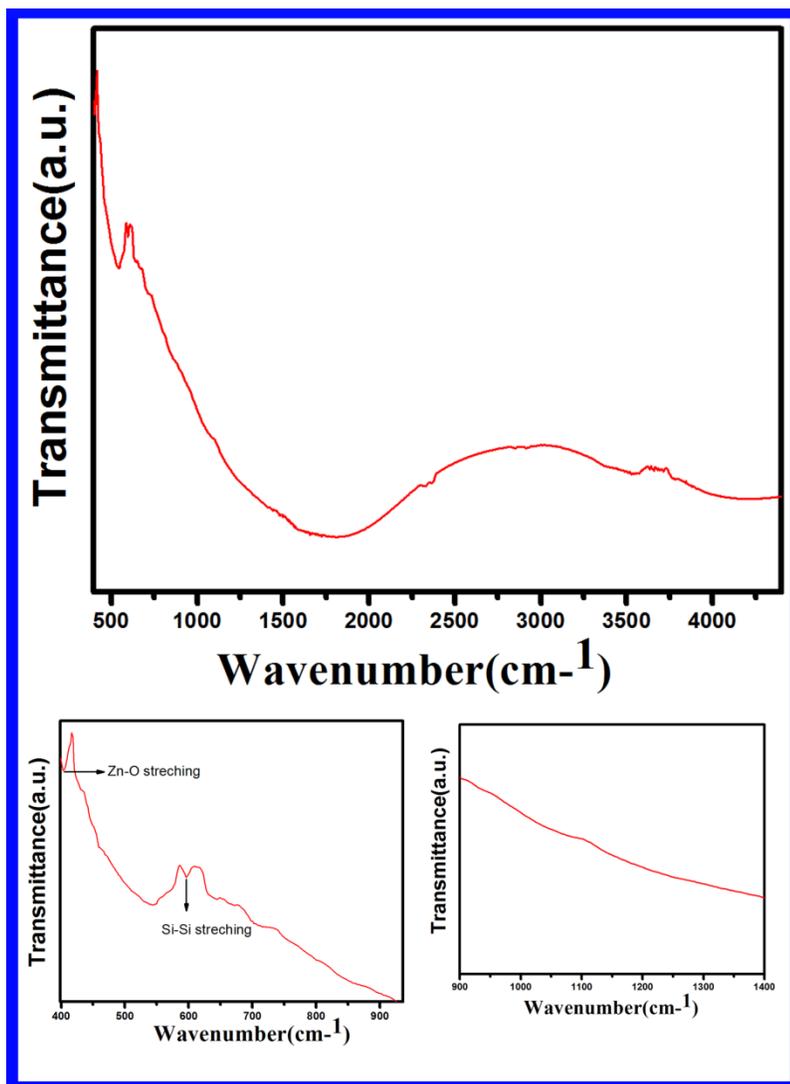


Fig. S4: chemical structure of PSS.

FTIR investigation:

The synthesized product on silicon is characterized with FTIR spectroscopy in transmission mode and the corresponding spectrum is given below:



Two regions within the spectrum are magnified and given in the lower panel of the above figure.

The absorption dip around ~ 410 cm⁻¹ and ~ 610 cm⁻¹ caused by Zn-O stretching [Zerdali et al, Materials Letters, 2006, 60, 504] and Si-Si stretching [E. Kayahan, Journal of Luminescence, 2010, 130, 1295–1299] respectively. There is no specified absorption dip corresponding to O=S=O symmetric stretch or SO₃⁻ symmetric stretch of PSS in the region 1037 cm⁻¹, 1189 cm⁻¹,

1130 cm^{-1} [Yuan et al. J. Mater Chem. 2009, 19, 246-252]. This signifies that in the final product, there is no trace of PSS. We think that during washing hydrophilic PSS that were absorbed during growth get removed. Wang et al. is observed no trace of PSS in the final product during their PSS controlled growth which commensurate with our results [C. Wang, Y. Ye, B. Tao and B. Geng, CrystEngComm. DOI: 10.1039/c2ce06707b].

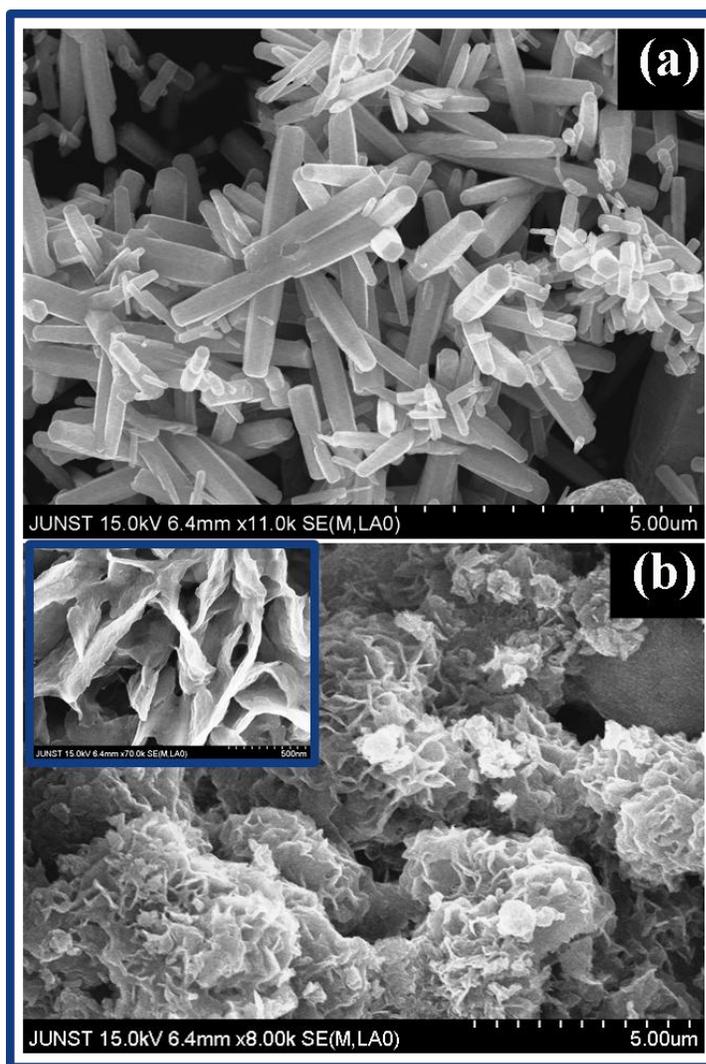


Fig. S5: FESEM image of the waste product (a) without PSS (b) with 0.5 g PSS (inset show high magnification image).

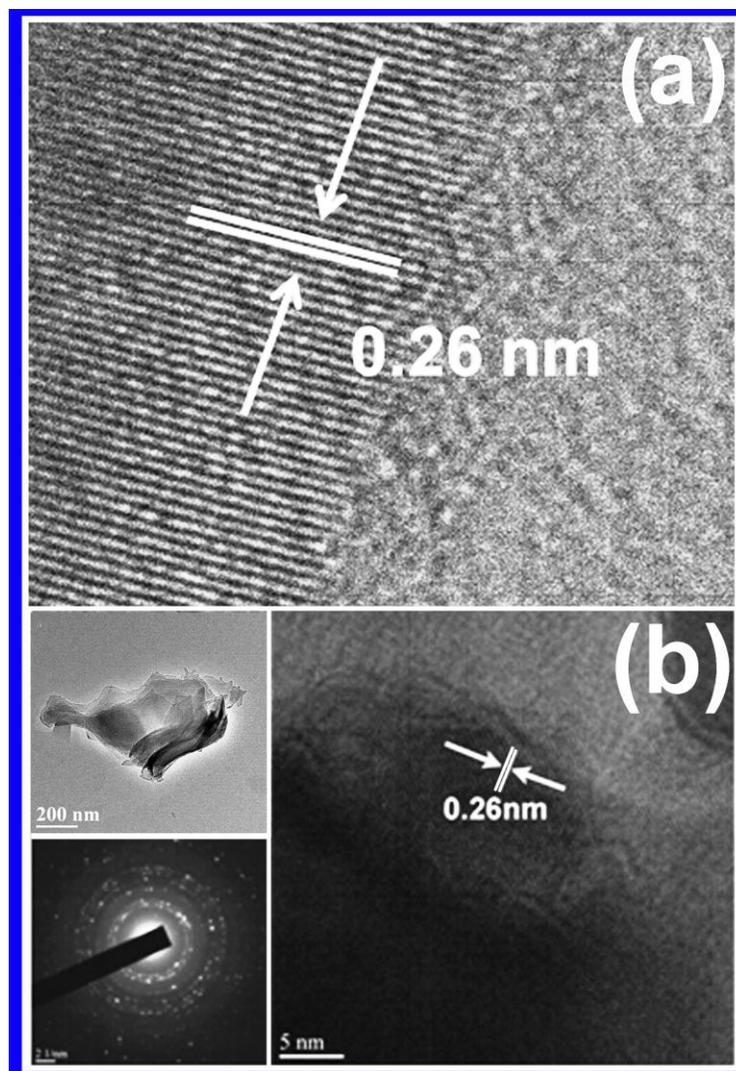


Fig. S6: TEM image of the waste product (a) without PSS (b) with 0.5 g PSS.

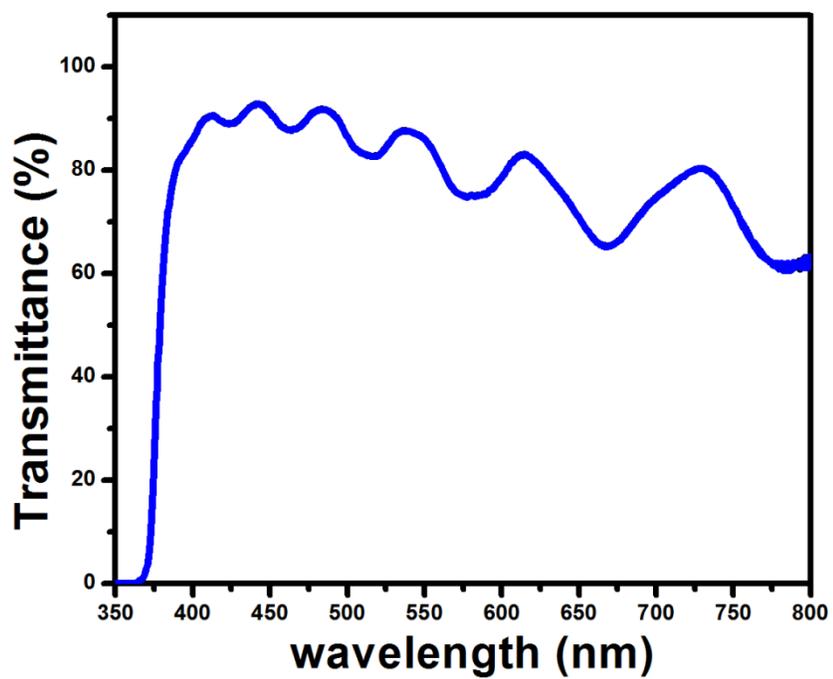


Fig. S7: Transmittance spectra of hierarchical nanosheet over ITO coated PET.