Electronic Supplementary Material (ESI) for Nanoscale.


## ELECTRONIC SUPPLEMENTARY INFORMATION:

# Solution processed *n*-$In_2O_3$ nanostructures for organic-inorganic hybrid *p-n* junctions

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**Experiment:**

**Preparation of $In_2O_3$ colloidal dispersion:** 50 mg of the prepared $In_2O_3$ nanoparticulates were dispersed in a 20 ml mixture of ethanol and chloroform (1:1). The dispersant was then sonicated for a period of 30 min and aged for 6-12 h. Such treatments were carried out to ensure the separation of larger particulates (as a result of decantation) from the colloidal media. Two-three cycles were carried out to procure a highly dispersed transparent colloidal dispersion. The same was then used for drop casting the interfacial layers.

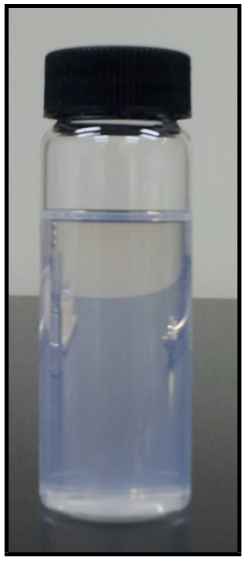

**Figure S1: Highly dispersed/transparent $In_2O_3$ colloidal dispersion.**

**Hydrothermal synthesis of ZnO nanowires:** The ITO substrates were pre-cleaned using ethanol and acetone initially. The seed layers were prepared by immersing the ITO substrates in a solution made of zinc acetate in ethanol, under stirring for a period of 15 min at 65-70° C. The substrates were then dried in a dry stream of nitrogen gas and annealed at 350° C for 30 min. 3-5 cycles were repeated to obtain uniform deposition of ZnO seed layers. The prepared seed layers were then subjected to hydrothermal treatment in a solution made of 25 mM zinc nitrate and hexamethylene tetramine, respectively. The growth conditions for the nanowires involved 120° C/3-9 h. The final products were annealed at 450° C for 30 min.

**Establishing $In_2O_3$ buffer layers:** The buffer layers were established on the ZnO NW's via drop casting the colloidal solution used for the fabrication of $In_2O_3$ working electrodes. The electrodes were heat treated at 90° C in between each cycles (two-three) for a period of 10 min each and finally annealed at 450° C for 30 min.