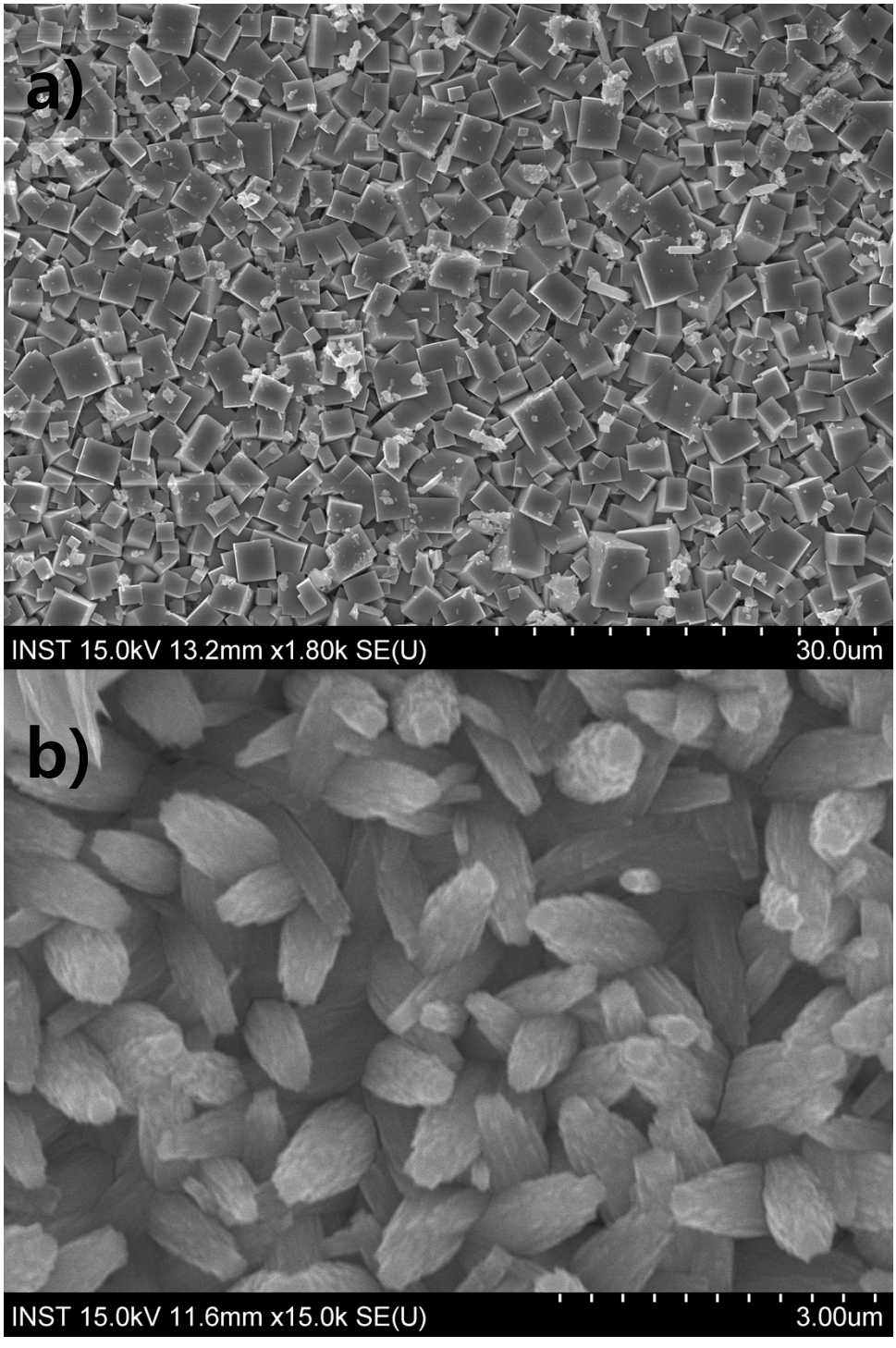
Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supplimentary Information for :

A coordination chemistry approach for shape controlled synthesis of indium oxide nanostructures and its photoelectrochemical prop erties

Dipak V. Shinde, Do-young Ahn, Vijaykumar A. Jadhav, Deok Yeon Lee, Nabeen K Shrestha, Joong Kee Lee, Hwa Young Lee, Rajaram S. Mane and Sung-Hwan Han*



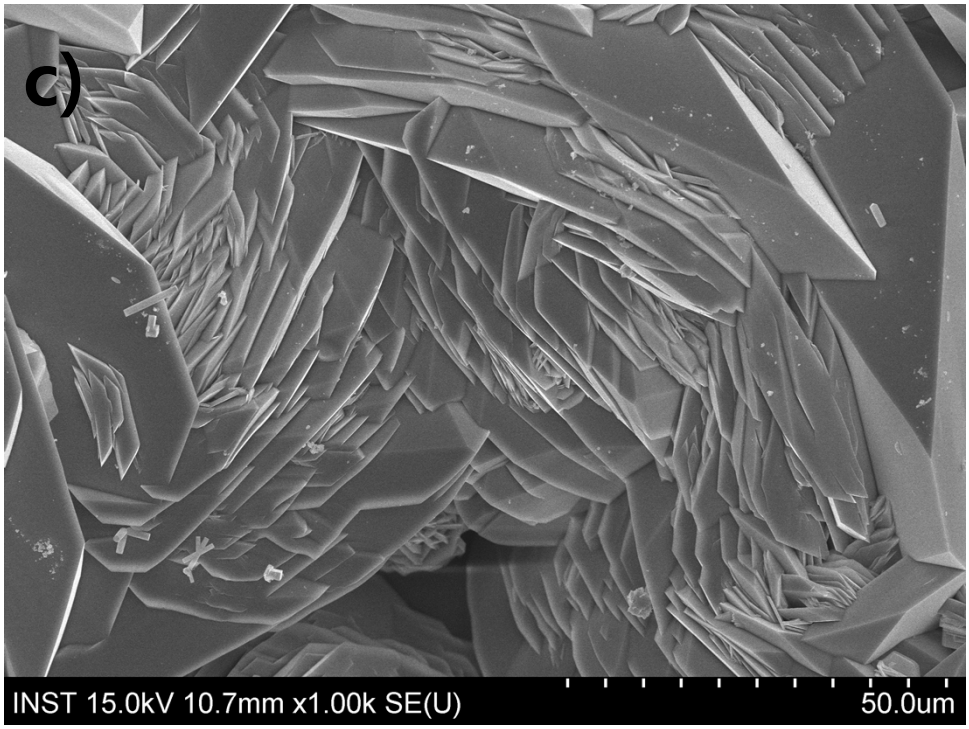
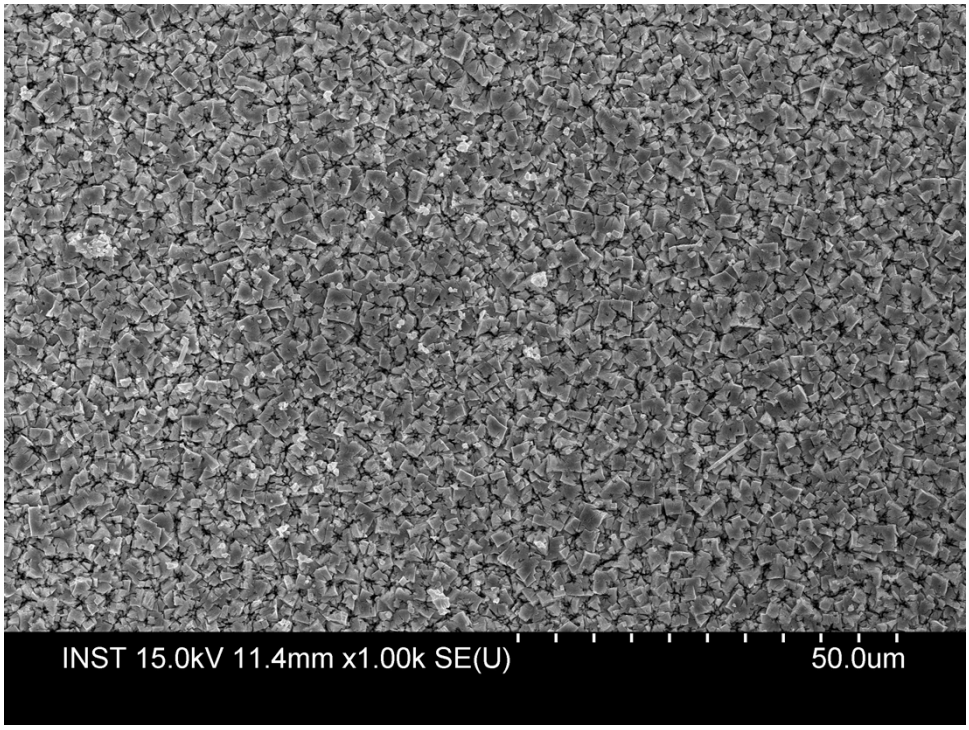


Fig. S1 Lowmagnification SEM images of the indium hydroxide cubes (a), maize corns (b) and indium sulfate h ydroxide hydrate crystals (c).



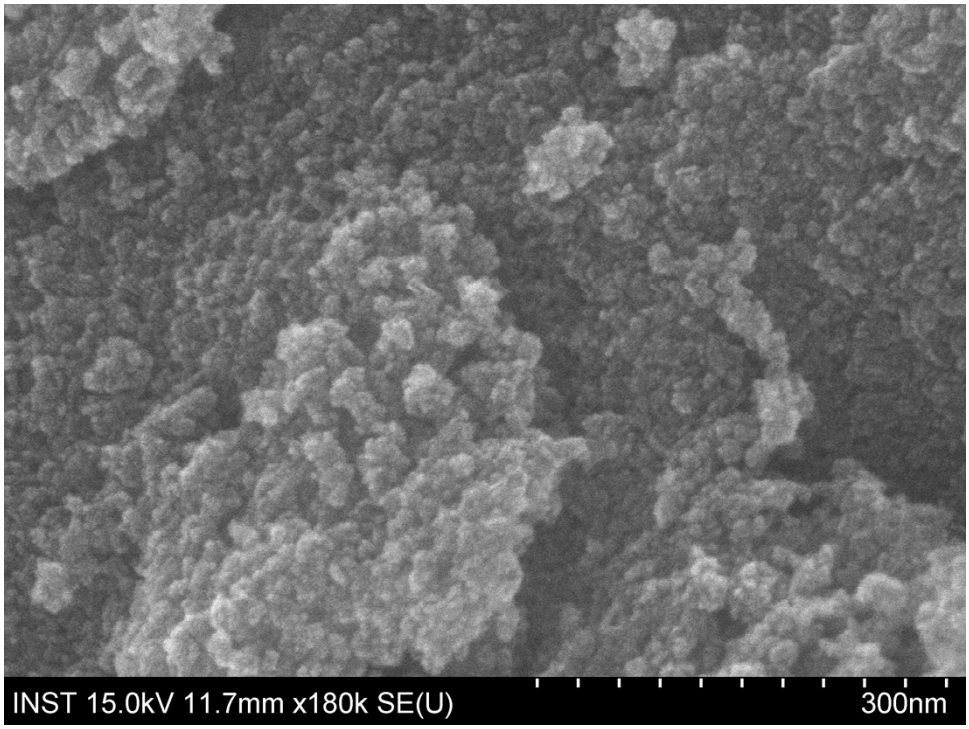


Fig. S2 Low magnification SEM images of indium oxides cubes and particles.

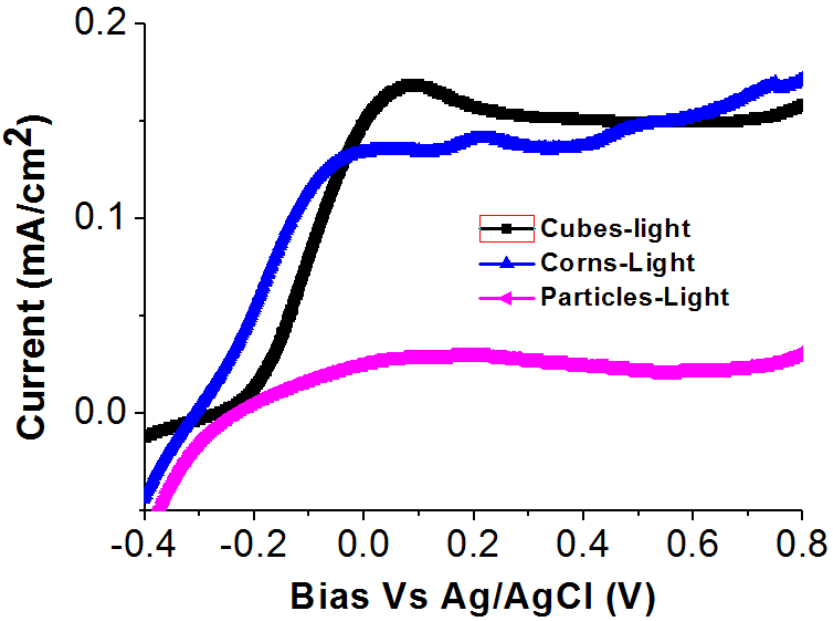


Fig. S3. Current-Voltage characteristics of indium oxide cubes, maize corns and particle films on FTO substrate s measured in a three electrode electrochemical cell using Pt plate as counter and Ag/AgCl(3M Nacl) as referenc e electrode. The electrolyte was 1M NaOH solution. The measurements were carried by irradiating the sample w ith simulated 1 Sun illumination.

Table S1 shows the conduction and valence band positions of indium oxide cubes, maize corns and particles cal culated from the absolute electronegativity values using the following equations

$$E_{CB} = X - 0.5E\text{g} + \text{E}_\text{e}$$

$$\text{E}_{VB} = E_{VB} + E_g$$

Where, E_{VB} is valence band position, E_{CB} is the conduction band position, X is the absolute electronegativity of t he semiconductor, which is defined as the geometric mean of the absolute electronegativity of the constituent at oms, E_e is the energy of free electrons on the hydrogen scale (*ca.* 4.5 eV), E_g is the band-gap of the semiconduct or.
It is clear that all the three samples with different morphologies have different electronic structures with valence and conduction band levels are located at different energies. Thus a simple chemical strategy can be used to tune band-edge positions of indium oxide electrodes.

References:
1 Y. Xu and M. A. A. Shoonen, *Am. Mineral.*, 2000, 85, 543

Samples	Electronegativity (eV)	Estimated band-gap from UV-Vis spectra (eV)	Valence band Level (eV) vs vacuum	Conduction band Level (eV) vs vacuum
Cubes	5.26	2.84	6.68	3.84
Maize corns	5.26	2.97	6.74	3.77
Particles	5.26	3.29	6.90	3.61