

SUPPLEMENTARY INFORMATION:

Experiment:

Preparation of $Zn_{1-x}In_xO$ nanosheets: A homogeneous precursor solution made up of zinc acetate and Indium acetate (weight ratios of 90:10) was obtained using deionized water as the solvent. The prepared sol was subjected to a controlled precipitation reaction, by adding 6 g of KOH in drops, until it was ensured that the precipitation ceased. The entire reactions were carried out at $\approx 90^\circ\text{C}$. The obtained sols were then subjected to sonication for a period of 60 min, to accelerate the pyrolytic reactions of H and OH radicals. The resulting products were then aged for another 24 h before their harvest through washing with deionized water and ethanol to remove the possible ionic impurities. The final products were dried at room temperature for 24 h and calcined at 450°C for 2 h, before further studies.

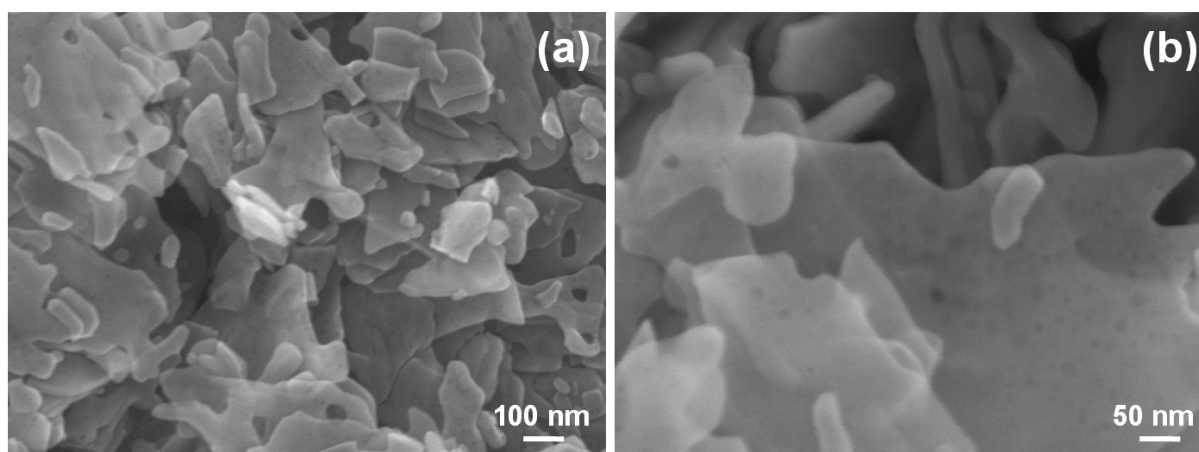


Figure S1: Morphological distribution of the $Zn_{1-x}In_xO$ nanostructures observed using SEM.

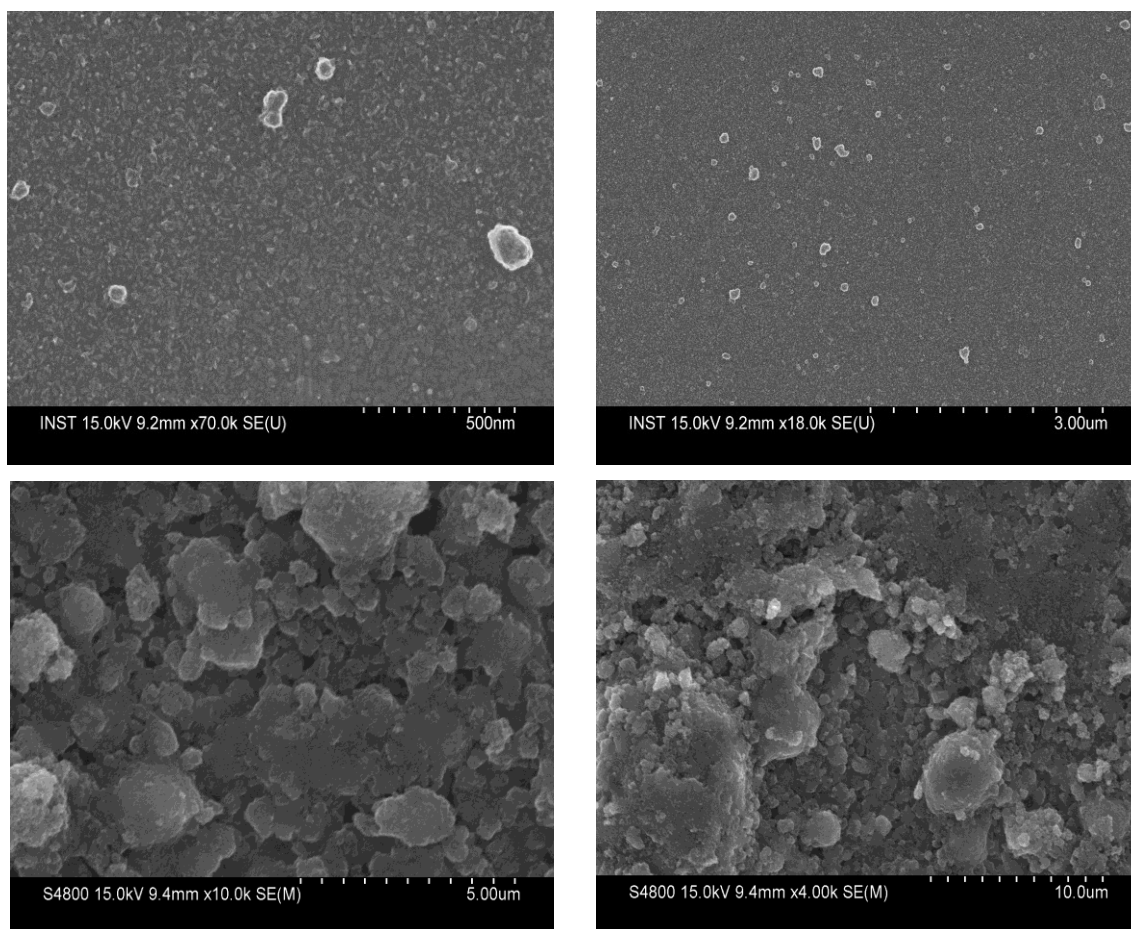


Figure S2: Morphological evolution of the PPy deposits on sapphire substrates.

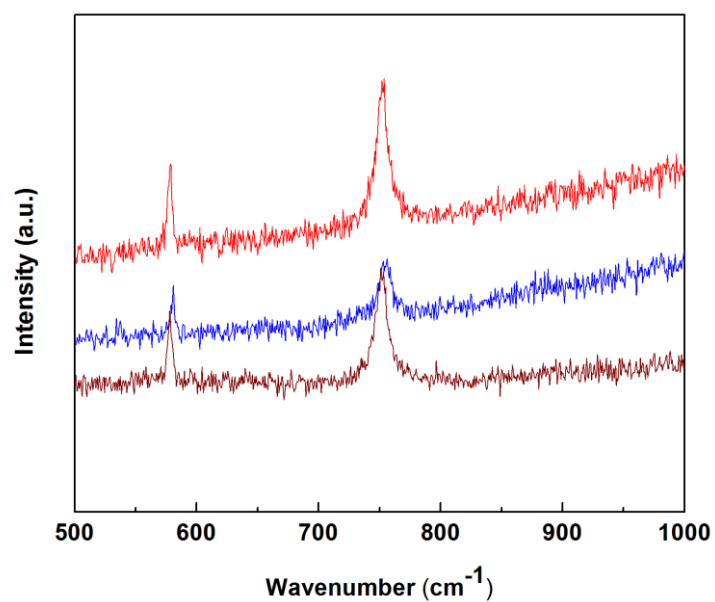


Figure S3: Room-temperature Raman spectra of the hybrid heterostructures, revealing the substrate effects at 578 and 752 cm⁻¹, respectively.

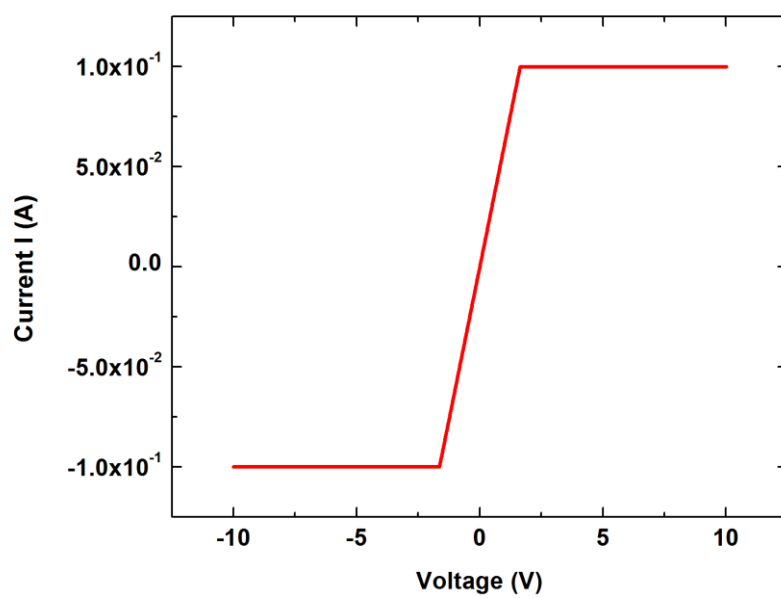


Figure S4: I-V characteristics revealing the ohmic behaviour of Ni_{1-x}Co_xO nanostructures deposited on PPy.