

Electronic Supplementary Information (e-SI)

Fabrication and Characterization of a NiO-ZnO/PANI-CNTs Composite for Sensing of Methanol in an Aqueous Environment†

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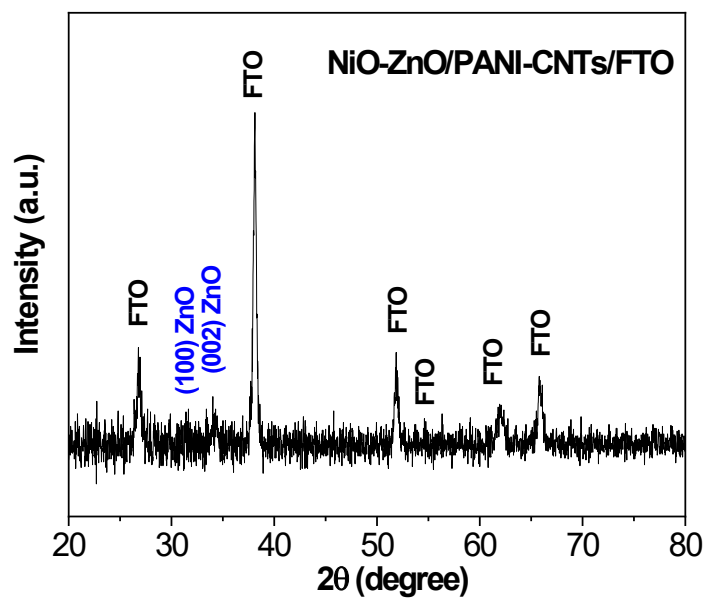


Fig. S1. XRD pattern of NiO-ZnO/PANI-CNTs/FTO electrode

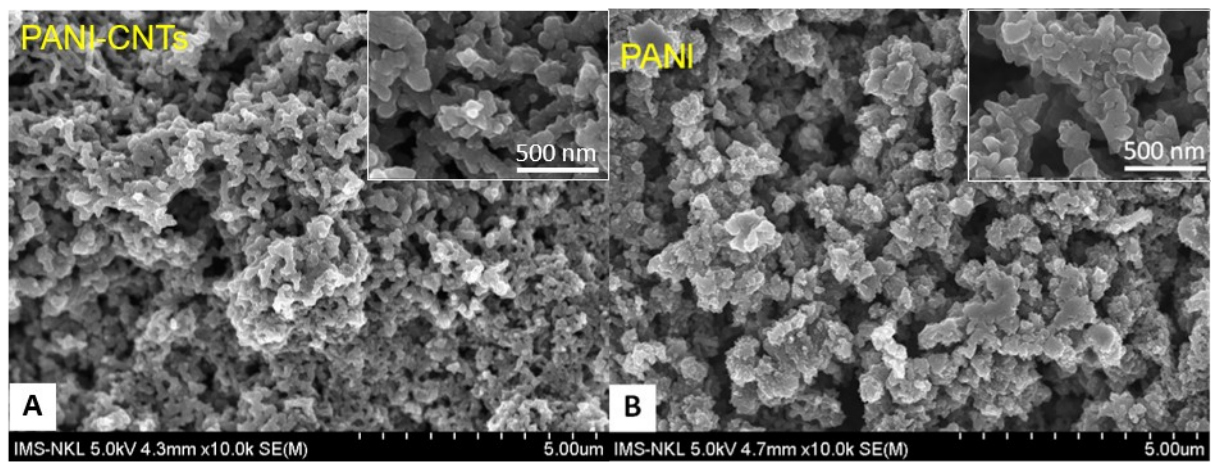


Fig. S2. SEM images of (A) PANI-CNTs and (B) PANI

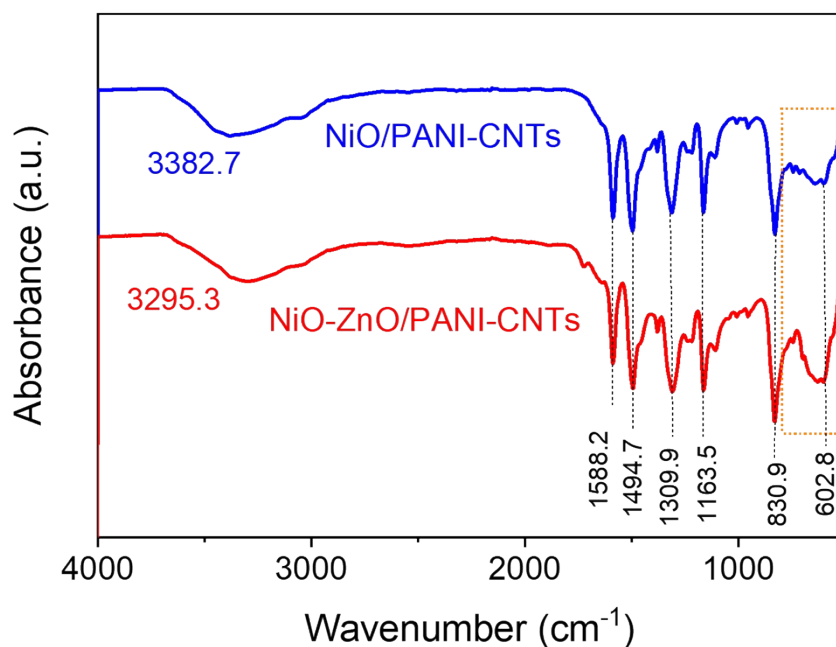


Fig. S3. FTIR of PANI-CNTs, NiO/PANI-CNTs and NiO-ZnO/PANI-CNTs

Fig. S3 shows the FTIR spectra of the two composites, NiO-ZnO/PANI-CNTs, and NiO/PANI-CNTs, pointing out the distinct peaks that are associated with the functional group vibration of PANI: 3300 cm^{-1} (-N-H- stretching); 1588 cm^{-1} and 1494 cm^{-1} (C = C stretching of the quinoid and benzenoid ring); 1309 (C-N-C stretching mode of the second arylamine); 1153 cm^{-1} (C-H in-of-plane bending of the quinoid ring); 830 cm^{-1} (in-of-plane bending) and the band at around 602 cm^{-1} could be assigned to the Ni – O stretching vibration¹. The Zn-O stretching frequency was not in the measurement range, which should be in the range of $400\text{ cm}^{-1} - 500\text{ cm}^{-1}$ ².

References

1. N. Thi Kim Ngan, N. Thi Thom, N. N. X. An, L. V. Hai, P. Thi Nam, H. Le Thanh Nguyen, P. Van Viet, N. Thi Thu Trang, N. T. Hoang and D. L. Tran, *Journal of The Electrochemical Society*, 2021, **168**, 107509.
2. M. N. Siddique, T. Ali, A. Ahmed and P. Tripathi, *Nano-Structures & Nano-Objects*, 2018, **16**, 156-166.