ABSTRACT

The present study aims to synthesize z-scheme heterojunction of graphitic carbon nitride (g-C_3N_4), poly 3-hexylthiophene (P3HT) doped copper oxide (CuO) nanorods (NRs) by co-precipitation technique. Characterizations succeeded in evaluating the catalytic and antimicrobial activities of the synthesized samples. X-ray diffraction (XRD) investigation revealed the monoclinic crystal phase of CuO. UV-visible spectroscopy was employed to study the optical properties. Electronic spectra identified blue shift by incorporation of P3HT and g-C_3N_4, leading to an increment in band gap energy. Fourier transform infrared (FTIR) spectra proclaimed the existence of rotational and vibrational modes associated with the functional groups during synthesis activity. Catalytic degradation of toxic methylene blue (MB) dye was revealed by synthesized NRs in neutral, basic, and acidic media. CuO NRs doped with P3HT and (2 and 4%) g-C_3N_4 demonstrated promising anti-bacterial tendencies against multiple drug-resistant (MDR) *Escherichia coli* (*E.coli*).