

ABSTRACT

The motivation behind the focused and intense research in the field of nanomaterial is owing to promising and established properties that can be plugged into applications. Metal sulfides (MS) and oxide (MO) nanomaterial epitomize a fairly new class of materials and under intensive investigations since few decades for potential application in various fields like photo-catalysis, thermal stability, bio-mineralization, drug delivery, and optoelectronic applications. In this work, metal sulfide (CuS, PbS) nanomaterial was synthesized by a hassle-free aqueous route under microwave irradiation with different morphologies as spherical, tubular, leaf-like and strip type shape without assistance of any surfactant/template. Whereas metal oxide (PbO, Mn₃O₄) were prepared by thermal decomposition of oxalate precursor of relative metal synthesized using the soft chemical method. Various techniques were employed to characterized the synthesized nanomaterial such as X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), fourier transform infrared spectroscopy (FTIR), ultraviolet-visible (UV-Vis) spectrophotometry, differential scanning calorimetry (DSC), and thermogravimetric analysis (TGA). Mn₃O₄ were examined as adsorbent material for anti-cancer drugs doxorubicin-DOX, daunorubicin-DNR and cisplatin-CPN from aqueous solution. Kinetics study was conducted to investigate the phenomenon and mechanism of adsorption of drugs onto Mn₃O₄.