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Green Synthesis of CuO@Hydrochar by lavandulifolia s Extract and Evaluation of Extract effects on the Nanoparticles Morphology and Size

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The use of plant extracts in the synthesis of nanoparticles can be an eco-friendly[1], cost-effective and easy-to-synthesize method as well as an alternative to conventional methods such as physical and chemical ones; this has made the green synthesis of nanoparticles of interest to many researchers[2,3]. As part of this work, CuO nanoparticles and nanocomposites with hydrogen storage capability were synthesized. The extract of Stachys lavandulifolia is used as the reducing agent for Cu^{+2} in the biosynthesis of CuO NPs in the presence of 1 Mm $CuCl_2$ solution, then the nanocomposite was synthesized based on hydrochar. The physical and chemical properties of the CuO nanoparticles and nanocomposite have been analyzed in the facility of X-ray diffraction (XRD), scanning electron microscopy (SEM), and Fourier transform infrared (FT-IR). X-ray diffraction (XRD) patterns have been investigated for the detection of phase and size and crystal structure as well as the proof of the formation of CuO nanoparticles and nanocomposite, scanning electron microscopy (SEM) for morphology and Fourier Transform Infrared (FT-IR) analysis is for difference bonds checked.

Keywords: lavandulifolia, CuO, Hydrochar, green synthesis

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