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Facile preparation of diverse copper oxide nanostructures and their characterization

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Abstract

Copper oxide (CuO) nanostructures, such as nanoshuttles, nanodisks and nanoparticles are synthesized by simple hydrothermal and wet chemical methods. The CuO nanostructures are prepared by thermal dehydration of Cu(OH)₂.H₂O crystal hydrate without any additives. The CuO nanostructures are characterized by energy dispersive X-ray absorption spectroscopy (EDAS), scanning electron microscopy (SEM), Fourier transform infrared (FT-IR) spectroscopy, UV-vis spectroscopy and X-ray diffraction (XRD) techniques. The SEM images show that diameter of CuO nanoshuttles ranges from 300–400 nm and length of ~1 μ m. The platelet-like porous CuO nanoparticles have thickness of 0.2–0.4 μ m and width of 0.5–1.5 μ m. The CuO nanodisks have diameter of 500–700 nm and thickness of 60–120 nm. The EDAS analysis confirms purity of CuO samples. The FTIR spectra of CuO nanostructures exhibit that the vibration peaks correspond to stretching vibrations of Cu–O bond.

Keywords: CuO nanostructures, Facile preparation, Morphology analysis, Optical properties

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