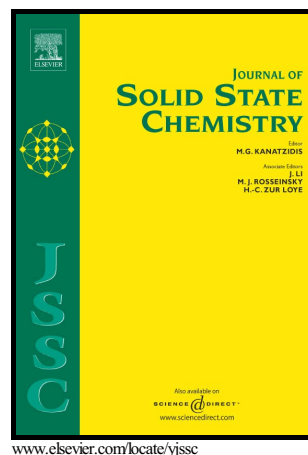


Eco-friendly synthesis of cuprous oxide (Cu_2O) nanoparticles and improvement of their solar photocatalytic activities

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Eco-friendly synthesis of cuprous oxide (Cu₂O) nanoparticles and improvement of their solar photocatalytic activities.

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Abstract

In this work, we have synthesized cuprous oxide (Cu₂O) nanoparticles with octahedral and spherical like shapes by an ecofriendly, simple and cost effective method, by using the aqueous extract of aloe Vera and copper sulfate as solvent and precursor respectively. The effect of Aloe Vera aqueous extract concentration on the morphological, structural and optical properties of as synthesized nanoparticles was studied by Scanning electron microscopy (SEM), X-ray diffraction (XRD), Fourier transform (FT-IR) spectroscopy and UV-visible diffuse reflectance. The SEM images showing octahedral and spherical agglomeration of nanoparticles. The cubic structure of Cu₂O was confirmed by XRD analysis, the crystallites size depends to the concentration of Aloe Vera aqueous extract with an average size ranged between 24 and 61 nm. The FT-IR vibration measurements valid the presence of pure Cu₂O in the samples. The UV-visible spectra show that the prepared cuprous oxide (Cu₂O) has a gap energy estimated from 2.5 to 2.62 eV. The photocatalytic activities of the as-prepared material were highly improved by the fast degradation of methylene blue in aqueous solution at room temperature under solar simulator irradiation.

Graphical abstract

Biosynthesis of Cuprous oxide (Cu₂O) nanoparticles using Aloe Vera leaves extract and improvement of their solar photocatalytic activities.

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