

Image Article

## Colour Changes Associated with the Synthesis of Copper Oxide Nanoparticles

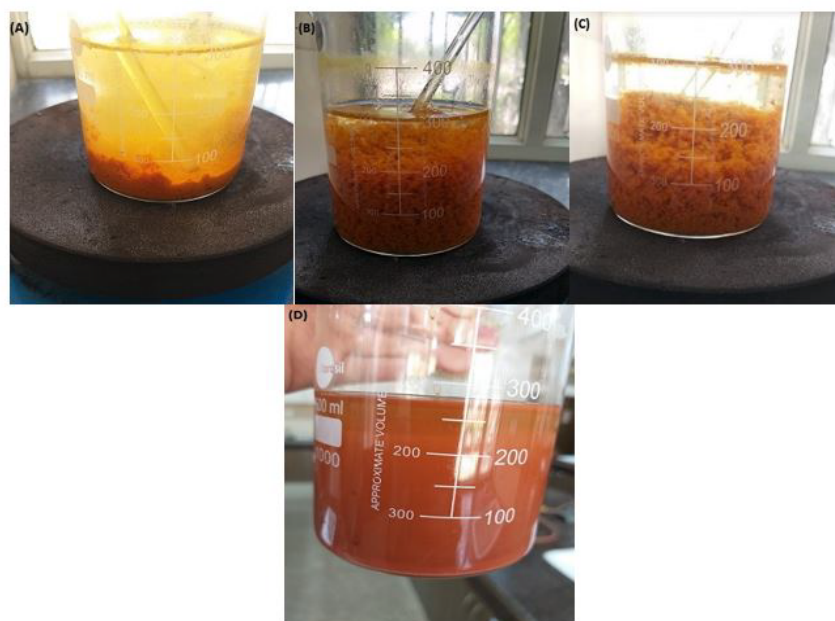
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### Abstract

Copper nanoparticles have a high tendency for oxidation. They are extremely sensitive to air, and the oxide phases are thermodynamically more stable. Thus, in order to minimize the oxidation and to control the growth of crystals, copper nanoparticles are usually protected with a capping agent. In these images, the copper nanoparticles were synthesized by chemical reduction process using copper (II) sulfate pentahydrate as precursor salt and starch as capping agent. The preparation method started with addition of 0.1 M copper (II) sulfate pentahydrate solution into 120 ml of starch (1.2%) solution with vigorous stirring for 30 minutes. In the second step, 50 ml of 0.2 M ascorbic acid solution was added to synthesize solution under continuous rapid stirring. Subsequently, 30 ml of 1 M sodium hydroxide solution was slowly added to the prepared solution with constant stirring and heating at 80°C for two hours.

### Keywords

Nanoparticles; Oxidation; Capping agent



**Figure 1:** Change in colour during the synthesis of copper oxide nanoparticles: A) Shows the initial colour change of solution; B) and C) With further addition of sodium hydroxide into this solution with continuous stirring, colour of solution changes with some cloudy appearance indicating the initial stage of formation of nanoparticles; D) The final colour of the solution turned yellow to ochre. After the completion of reaction, the solution was taken off from heat and allowed to settle overnight and the supernatant solution was then discarded cautiously. Ochre colour precipitates obtained were dried at room temperature. After drying, nanoparticles were stored in glass vial for further analysis

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