

Synthesis of low cost CuO nanoparticles by hydrothermal method

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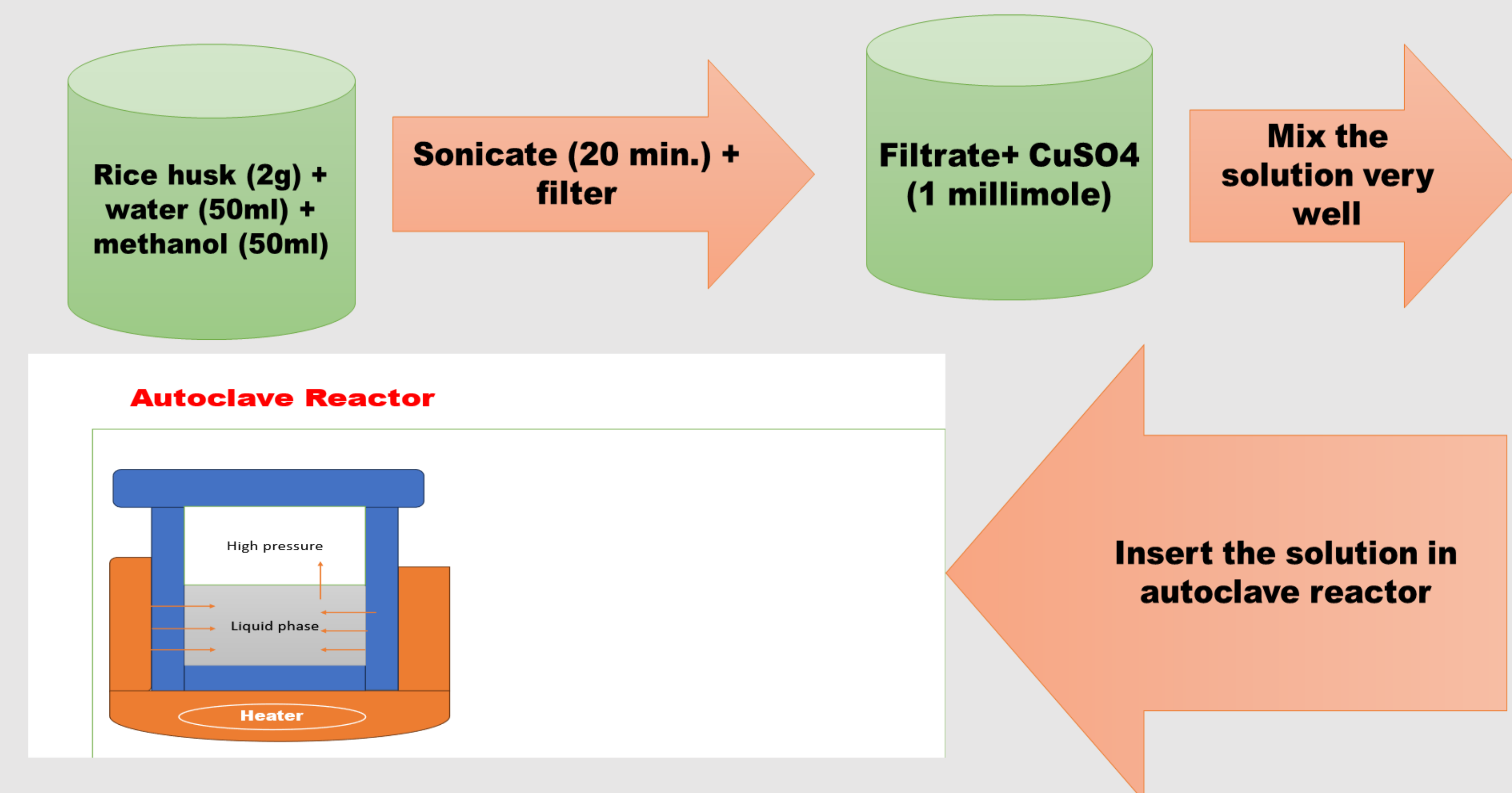
Abstract

It is interdisciplinary technology in physical science, chemical science and biological science. Among these nanomaterials CuO nanoparticles has been used as batteries, catalysts, gas sensors, high temperature super conductors and tools for solar energy conversion. We had synthesized CuO by hydrothermal method. In this method rice husk is used as supporting materials. 2g of rice husk was sonicated in 50 ml methanol and 50 ml water for 20 minutes. After the sonication the solution was filtered using lensman filter paper. In the filtrate different milli mole of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ crystal was added and stirred whole the solution for 15 min. The above solution was placed in autoclaves for 16 hours at 200°C temperature. The X-rays confirm the crystalline nature of CuO nanoparticles. The morphology will be identified by using scanning electron microscopy (SEM) and transmission electron microscopy (TEM). This nanoparticle will be further used as photocatalyst in dye degradation and electrocatalysis water splitting.

Introduction

The particles of matter which have the dimensions between 1 to 100 nanometres is considered to be the nanoparticles. These particles are very small and this is why known as ultrafine particles. Generally, there is no sedimentation takes place in nanoparticles because of undergoing Brownian motion of nanoparticles. Nanoparticles are the very small particles of size 1-100 nm and are used in the manufacture of various types of nanomaterials such as nanowires, nanochips, nanomedicines, nano fertilizers, biological instruments, in cement manufacture industries etc. Nanomaterials are low cost and highly efficient. Nanomaterials are that chemical substance or materials which is manufactured and used on a small scale of 1-100 nm size. Nanoparticle are generally used as a catalyst in various chemical reactions. Nanoparticles are used in drug delivery and increased the activity of drug in system. Nanoparticles are also used in the treatment of waste water. Copper oxide nanoparticles are highly abundant materials and low cost also. CuO nanoparticles are widely used in biomedical purpose due to their tremendous antimicrobial activity.

Reaction set up



Result
After observing the hydrothermal reaction we find CuO nanoparticles of 45 nm size. There are crystalline nature of CuO nanoparticles.

Conclusion

In conclusion, CuO nanoparticle is synthesized with excellent mechanical and electrical properties by fast, template free, reliable, scalable and step unique hydrothermal method and the materials prepared by of CuO NPs have various applications medical science. Copper oxide nanoparticles shows distinctly toxic effect in vitro as well as in vivo.

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Design and other information

Rice husk + CH_3OH + H_2O $\xrightarrow{\text{Stir + sonication}}$ **Add CuSO_4 + Hydrothermal condition**

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