Synthesis of CuO and Cu$_2$O nano/microparticles from single precursor: Effect of temperature on CuO/Cu$_2$O formation and morphology dependent nitroarenes reduction

V. Vinod Kumar,a A. Dharani,a Mariappan Mariappanb and Savarimuthu Philip Anthony a*
a) School of Chemical & Biotechnology, SASTRA University, Thanjavur-613401, Tamil Nadu, India. Fax: +914362264120; Tel: +914362264101; E-mail: philip@biotech.sastra.edu

b) Department of Chemistry, SRM University, Chennai-603203, Tamil Nadu, India.

(a)

![Intensity (a.u.) vs 2θ (deg) for Cu$_2$O nano/microparticles obtained by hydrothermal heating of Cu(NO$_3$)$_2$ with acetic acid at 175 °C.](image1)

(b)

![Intensity (a.u.) vs 2θ (deg) for Cu$_2$O nano/microparticles obtained by hydrothermal heating of Cu(NO$_3$)$_2$ with formic acid at 175 °C.](image2)

Fig. S1. PXRD pattern of Cu$_2$O nano/microparticles obtained by hydrothermal heating of Cu(NO$_3$)$_2$ with (a) acetic acid and (b) formic acid at 175 °C.
Fig. S2. PXRD pattern of hydrothermally synthesized Cu$_2$O nano/microparticles and same materials calcined at 500 °C.

Fig. S3. PXRD pattern of hydrothermally treated CuO-1 nano/microparticles in presence of acetic acid at 175 °C.
Fig. S4. PXRD pattern of hydrothermally synthesized CuO nano/microparticles from Cu(OAc)$_2$ precursor at 125 °C and same materials calcined at 500 °C.

Fig. S5. FE-SEM images of Cu$_2$O nano/microparticles synthesized from Cu(acac)$_2$ precursor in hydrothermal method.
Fig. S6. Monitoring the conversion of 4-NP to 4-AP by CuO nano/microparticles synthesized hydrothermally at 125 °C from Cu(OAc)$_2$ precursor.

Fig. S7. Effect of CuO nano/microparticles concentration on the nitro group reduction rate of 4-NP.
Fig. S8. Reusability of CuO nano/microparticles for nitro group reduction of 4-NP.

Fig. S9. Comparing the reduction of 2-NA by different CuO nano/microparticles.
Fig. S10. Comparing the reduction of 3-NA by different CuO nano/microparticles.