Supporting Information

Facile synthesis of sulfobetaine-stabilized Cu_2O nanoparticles and their biomedical potential

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1. Synthesis of copper oxide nanoparticles without sulfobetaine SB3C16 (surfactant).

Copper oxide nanoparticles (Cu_2O NPs) were synthesized using copper(II) chloride as a precursor and hydrazine as a reducing agent. The synthesis was performed without any surfactant. The Cu_2O nanoparticles were obtained by mixing an equal volume of hydrazine solutions (10 mM/L) and copper(II)chloride (1 mM/L). The reaction conditions were similar to the synthesis of sulfobetaine-stabilized copper oxide nanoparticles in sample P1 (see Table S1). The reaction mixture was stirred for 3h at 25°C. When the colour of mixture turned from green to dark brown, the copper oxide nanoparticles were formed. In order to purify the final product, the copper oxide nanoparticles were centrifuged (20000 rpm, 40 min, four times) and washed with water and absolute ethanol. The Cu_2O NPs suspension was stored in the fridge (5°C).

Table S1. The composition of the reaction mixtures.

Sample	Precursor concentration, mM/L	Reducer concentration, mM/L	Sulfobetaine concentration, mM/L	Time, h	Temperature, °C
P1	1	10	20	3	25
P	1	10	-	3	25

The size distribution and shape of naked copper oxide nanoparticles were determined based on HRTEM measurements (Figure S1 and S2). As shown in Figs. S1 and S2, during the one-step chemical reduction reaction performed without sulfobetaine, the spherical copper oxide nanoparticles with a diameter varied from 19-26 nm and an average diameter of 20 nm were synthesized. The diffraction rings of SAED pattern shown in the inset of Figure S1 confirmed the polycrystalline character of naked Cu_2O nanoparticles. Based on HRTEM micrographs it can be seen that the copper oxide nanoparticles exhibited much greater tendency to form aggregates in comparison with the sulfobetaine-stabilized copper oxide nanoparticles (sample

P1, Figure 2d). Moreover, the size of Cu_2O nanoparticles obtained without sulfobetaine was significant higher (sample P, d_{av} = 20 nm) than sulfobetaine-stabilized copper oxide nanoparticles (sample P1, d_{av} = 2.2 nm) prepared under similar reaction conditions.

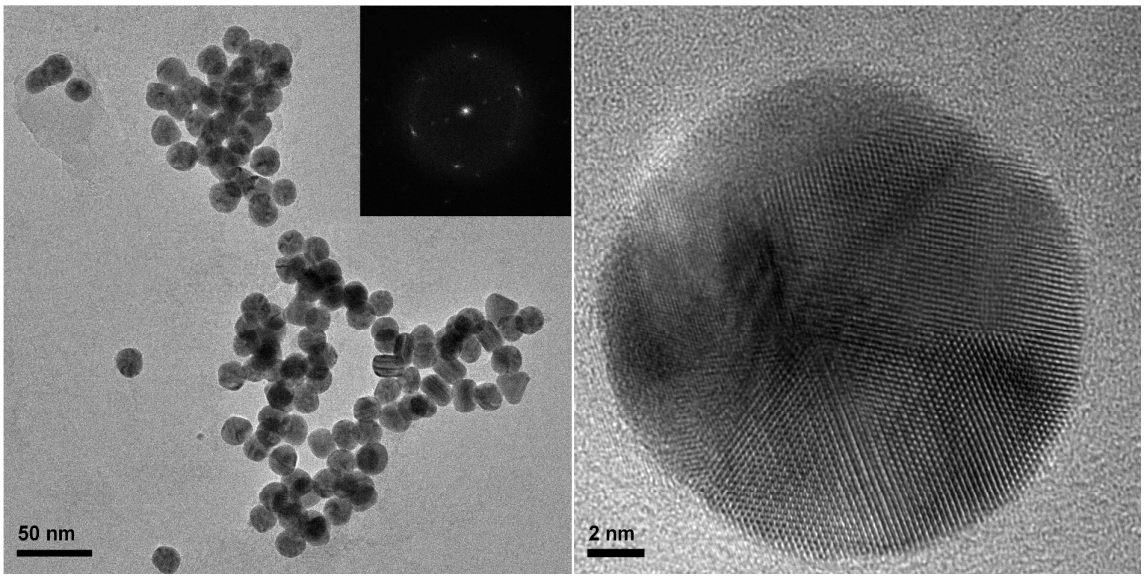

Figure S1. HRTEM micrographs of the copper oxide nanoparticles obtained without sulfobetaine SB3C16 (surfactant).

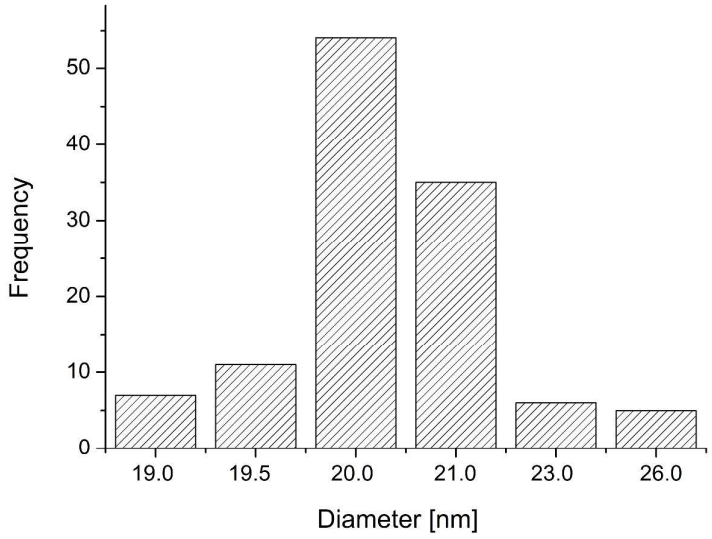

Figure S2. Histogram illustrating size distribution of the copper oxide nanoparticles obtained without sulfobetaine SB3C16.