

### Study on Synthesis of Copper Sulfide Nanoparticles and Its Adsorption Capacity of Gaseous Formaldehyde

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It was synthesized copper sulfide particles at 42, 57, 77 and 92°C by using 1 M CuSO<sub>4</sub>·5H<sub>2</sub>O and 1 M CuSO<sub>4</sub>·5H<sub>2</sub>O in aqueous solution to remove efficiently gaseous formaldehyde indoor. The copper sulfide is Cu<sub>0.97</sub>S and has crystal peaks such as 27.68° (101), 29.28° (102), 31.79° (103), 32.85° (006), 47.94° (110) and 52.72° (108). Average crystallite size was calculated by Scherrer's equation and was 0.24, 0.18, 0.12 and 0.07 nm at 42, 57, 77 and 92 °C, respectively. Its average crystallinity was 58.3, 60.2, 62.1 and 63.9 % at 42, 57, 77 and 92 °C, respectively. Adsorption capacity of the copper sulfide were 37.4, 38.0, 38.1 and 39.8 %, respectively, in 1 h and were 25.3, 30.6, 34.4 and 37.7 %, respectively, in 5 h at 42, 57, 77 and 92 °C. The adsorption capacity of copper sulfide was higher with an increasing time from 42 °C to 92 °C and the adsorption capacity of copper sulfide at 92 °C was the highest. The copper sulfide from this study was used as a functional fillers for indoor construction materials and it could remove efficiently gaseous formaldehyde.