Zeta potential study of Copper Sulfide Nansheets With Different Surfactants

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**Abstract**. In this study, we investigated the zeta potential of CuS nanoparticles (NPs) that were synthesized using CTAB and PVP as surfactants or capping agents via a simple polyol method. The crystal structure of CuS was confirmed as a single phase, hexagonal-closed crystal structure with space group P63/mmc through X-ray diffraction (XRD) and Raman spectroscopy. Energy-dispersive X-ray spectroscopy (EDAX) data showed a slight deviation from a 1:1 ratio of Cu to S due to excess sulfur used during synthesis. Field Emission Scanning Electron Microscope (FESEM) images demonstrated the agglomeration of sheet-like CuS. The effect of different capping agents on the surface charge of CuS NPs was evaluated using zeta potential measurements in deionized (DI) water. Results indicated that all NPs are unstable in DI water. The hydrodynamic diameter (HD) distribution curve revealed that particles agglomerated more rapidly for pure CuS than for the capped samples. This information is anticipated to be valuable for various applications, such as biological labelling, batteries, paint pigments ceramics, and photocatalysts for organic pollutant degradation.