Low temperature synthesis of CuS nanowhiskers thin film by CBD

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Copper sulfide (CuS) thin films were successfully deposited on indium-tin-oxide-coated glass substrates using chemical bath deposition (CBD) method. The aqueous solution contains of copper sulfate and thioacetamide as copper and sulphur precursor where acetic acid acted as proton donor. Deposition time was used as experimental variable and optimized in order to obtain good-quality of CuS thin films. Characterization of the films was carried out by using X-ray diffraction (XRD), scanning electron microscopy (SEM) and optical absorption (UV-Vis). It was found that the films formed polycrystalline covelite which has very compact morphology and has nanowhiskers shape. Maximum thickness of the film was 0.18 μm obtained by deposition time of one hour and temperature of 60°C. Absorbance of the film was relatively high with optical band gap of 2.8 eV.