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Synthesis of CuS/S Nanocomposites and Their Application Fields

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Copper sulfide and sulfur nanoparticles have many application fields in industry and technology[1, 2]. Nowadays, copper sulfide and sulfur nanocomposites can be used as a semiconductor in electrochemistry, photocatalyst in catalysis and in battery technology[2, 3]. In this report, nanocomposites of CuS@S were co-precipitated via the reaction $Na_2S_n + CuSO_4 \rightarrow CuS + S + Na_2SO_4$. Obtained black precipitate was separated, washed and dried for the further analyses. X-ray powder diffraction analysis (D8 ADVANCE, Bruker) was used for characterization morphology and composition of obtained nanocomposite. X-ray data showed that the sample contained two phases: CuS and S_8 (orthorhombic, Space Group Fddd, no. 70), see Figure 1. According to the semi-quantitative analysis, chemical composition of sample was 67.9% CuS and 32.0% S_8. Copper sulphide had a hexagonal crystal lattice and sulfur was well crystallized. The crystallite size of CuS and S_8 were 22.4 nm and 54.6 nm respectively.

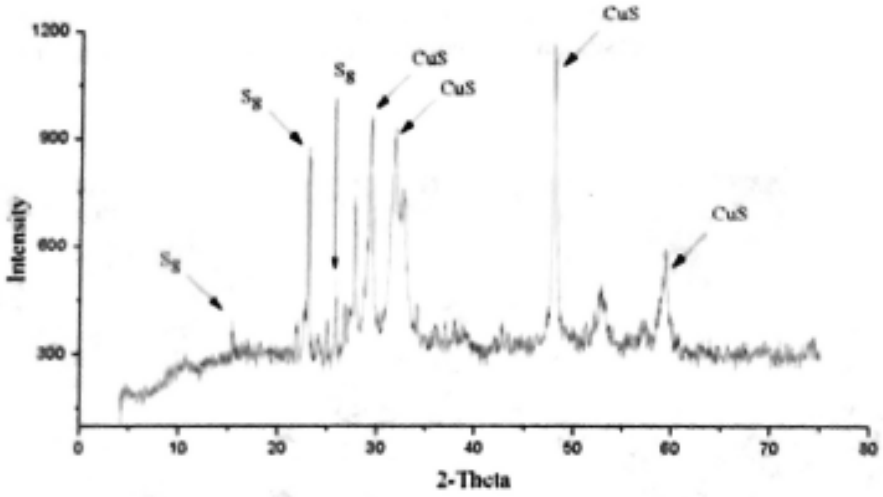

Fig. 1. XRD pattern of CuS/S nanocomposite.

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