SYNTHESIS, CHARACTERIZATION AND SELF-ASSEMBLY OF CU2S NANOCRYSTALS

CHERUVATHOOR POULOSE Aby, VEERANARAYANAN Srivani, YOSHIDA Yasuhiko,
MAEKAWA Toru, D Sakthi Kumar

Toyo University, Kawagoe, J

Abstract
A simple colloidal approach is developed to prepare size- and shape-controlled copper (I) sulfide (Cu$_2$S) NCs in a mixture of oleylamine and 1-octadecene at a relatively high temperature without using any pyrophoric ligands. The parameters such as reaction time, temperature and concentration of surfactant, oleylamine were constantly varied and the resultant particles were analyzed. The crystal structure, chemical composition and morphology of the as-obtained products were characterized by XRD, XPS, TEM and SEM. In addition optical characteristics, band gap calculation and FT-IR analysis were also carried out. The morphology and size of the Cu2S NCs could be easily controlled by adjusting the reaction parameters. The Cu2S NCs had a high tendency to self-assemble into close-packed superlattices structures with unidirectional growth. The shape and size of the NCs were seen to be affected with the reaction conditions under study. This colloidal approach may extend to synthesis of other metal sulfide NCs with different shapes and sizes. Catalytic activities of these NCs have been studied by growing carbon nanotubes using chemical vapor deposition method.

Keywords: Copper sulfide NCs, Organometallic synthesis, Self-assembly.

Author did not supply full text of the paper/poster