Synthesis of Graphenated CuS by Simple Facile Route for the Hydrogen Generation Application

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Abstract

Copper being a transition metal exhibits a combination of excellent physical, chemical, and electronic properties. It possesses a high electrical and thermal conductivity due to high density of free electrons. Copper commonly exhibits +1 an +2 oxidation states enabling redox behaviour significant in catalytic activity. In research and advanced technologies copper plays a crucial role in heterogenous and electrocatalysis, semiconductor and energy storage devices and antimicrobial applications. Herein, we have developed the Graphenated Copper Sulphide (rGO-CuS) nanoparticles by using Cupric oxide (CuO) and Cuprous oxide (Cu_2O) incorporated graphene leading into the formation of rGO-CuS. The XRD patterns revealed the crystal phase, i.e., covellite. Similarly, the FESEM defines the morphology of the material followed by HRTEM revealing the flakes or sheets of Graphenated CuS nanomaterial. The application of the synthesized nanomaterial is studied for the photocatalytic H_2 generation via water splitting. i.e. 7963.4 µmol/0.1 g in 4h irradiation time.

Figures

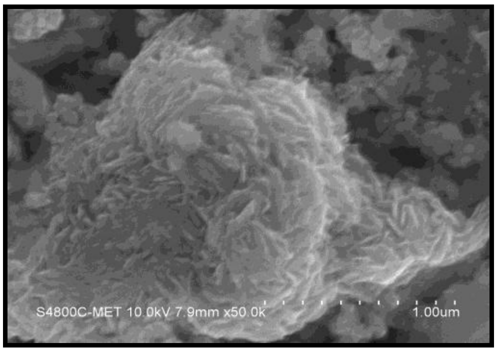

Figure 1: FESEM of rGO CuS

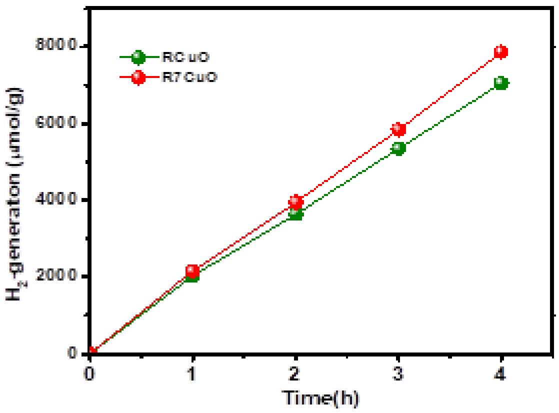

Figure 2: Photocatalytic activity of rGO-CuS