

Preparation and Characterization of Photocatalyst for the Conversion of Carbon Dioxide to Methanol

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Abstract : Carbon dioxide (CO₂) emission to the environment is inevitable which is responsible for global warming. Photocatalytic reduction of CO₂ to fuel, such as methanol, methane etc. is a promising way to reduce greenhouse gas CO₂ emission. In the present work, Bi₂S₃/CdS was synthesized as an effective visible light responsive photocatalyst for CO₂ reduction into methanol. The Bi₂S₃/CdS photocatalyst was prepared by hydrothermal reaction. The catalyst was characterized by X-ray diffraction (XRD) instrument. The photocatalytic activity of the catalyst has been investigated for methanol production as a function of time. Gas chromatograph flame ionization detector (GC-FID) was employed to analyze the product. The yield of methanol was found to increase with higher CdS concentration in Bi₂S₃/CdS and the maximum yield was obtained for 45 wt% of Bi₂S₃/CdS under visible light irradiation was 20 μmole/g. The result establishes that Bi₂S₃/CdS is favorable catalyst to reduce CO₂ to methanol.

Keywords : photocatalyst, CO₂ reduction, methanol, visible light, XRD, GC-FID

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