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Hydrothermal Assisted Synthesis of 'Ag' doped Graphine-Bi_2MoO_6 Composites with Superior Photocatalytic Performance and Stability

Owais Mehraj*

**Department of Chemistry, National Institute of Technology Srinagar, J&K, India-190006*
E-mail: owaismehraj36@gmail.com

Abstract—*In this study, we first synthesized rGO–Bi_2MoO6 heterostructuresby a hydrothermal approach in which the reduction of graphene oxide (GO) and the growth of Bi_2MoO_6 crystals occurred simultaneously in a Teflon lined stainless steel autoclave. 'Ag' nanoparticles were generatedon the surface of catalyst by photodeposition method. The morphology of as synthesized materials was characterized by Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM). The as prepared materials were also characterizedby X-ray diffraction, nitrogen adsorption–desorption isotherms, UV–vis diffuse reflectance spectroscopy, and Photoluminescence. The photocatalytic performance of the samples was analysed by the degradation of organic pollutant, Rhodamine B and colourless molecule Phenol. An increase in photocatalytic activity was observed for Ag-rGO–Bi_2MoO_6 hybrids compared with pure $Bi_2MoO_6$and rGo-Bi_2MoO_6under light irradiation from Mercury-Xenon arc lamp. The improved photocatalytic performance of Ag-rGO–Bi_2MoO_6 was attributed to improved charge separation of photo-generated electron-hole pairs by rGO and 'Ag' nanoparticles on the surface of catalyst. Meanwhile the recycling experiments demonstrated that the catalyst is highly stable and shows insignificant loss of activity in 5 cyclic runs.*

Keywords*: Hydrothermal method, photocatalytic, photoluminescence, Rhodamine B, phenol,'Ag' nanoparticles.*