Graphitic Carbon Nitride Sputtered with Silver Nanoparticles for Efficient Photocatalytic Degradation of Rhodamine B Dye

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doi: 10.20964/2018.05.83

Received: 31 January 2018 / Accepted: 9 March 2018 / Published: 10 April 2018

Graphitic carbon nitride (g-C₃N₄) powder was synthesized using a thermal polymerization method. Silver nanoparticles were uniformly deposited on thin sheets of g-C₃N₄ using a simple sputtering method. Pure g-C₃N₄ and Ag/g-C₃N₄ were tested for photocatalytic degradation performance of Rhodamine B dye under visible light. The degradation tests show that photocatalytic activity of heterostructured Ag/g-C₃N₄ was greatly enhanced compared with that of pure g-C₃N₄ even with as little as 0.08 wt% added silver. The percentage of silver used is significantly lower than that used in previous studies of Ag/g-C₃N₄ composite catalysts. The Ag/g-C₃N₄ catalyst also shows excellent stability over multiple reaction cycles.

Keywords: Photocatalytic degradation, Graphitic carbon nitride, Silver nanoparticles, Sputtering method, Electrochemical impedance spectroscopy.

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