Abstract

Self-doped SnS Microspheres with Highly Enhanced Photoreduction Efficiency for Cr(VI) Ions

Ali Rauf[1]

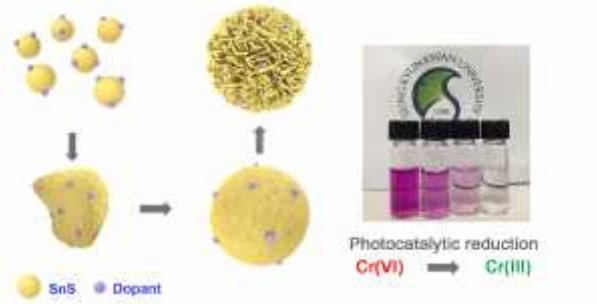
[1]Department of Chemistry and Chemical Engineering, Lahore University of Management Sciences (LUMS)

Keywords: self-doped, Cr(VI) reduction, Photocatalysis , nanoparticle

I. Abstract Body (up to 250 words)

Self-doped semiconductors have recently attracted extensive interest as highly efficient photocatalytic materials because the electronic properties can be modulated without sacrificing the chemical stability of the parent material. In this report, we report facile synthesis of Sn2+ self-doped SnS microparticles via a simple template-free hydrothermal route. Because of the ability to successful tune band structure while minimizing defect generation, self-doped SnS could potentially serve as an efficient photocatalyst of waste water. Here, Sn2+ self-doping results in insertion of an energy level slightly below the conduction band of SnS, thereby decreasing the photoexcitation energy. Furthermore, dopant sites can act as charge trapping sites, which can consequently minimize problematic charge recombination. Synthesized materials were characterized by various spectroscopic, microscopic, and surface characterization techniques, all of which confirmed the formation of self-doped SnS. Sn2+ self-doped SnS photocatalyst successfully reduced carcinogenic Cr(VI) to the water-insoluble Cr(III) form under visible light illumination. The best photocatalytic efficiency was obtained from an optimal balance between increased numbers of trapping sites leading to longer charge carrier lifetime, and decreased distance between trapping sites, favoring charge recombination. We anticipate that similar methodologies can be applied to other non-stoichiometric semiconducting photocatalysts with tunable electronic properties and enhanced photocatalytic efficiency. other tolerant and sensitive lines.

II. Image:



III. Reference:

1. C. Karunakaran, S. Kalaivani and P. Vinayagamoorthy, *Materials Express*, 2014, **4**, 125–134.
2. L. Ma, L. Xu, X. Xu, X. Zhou and L. Zhang, *Nano:Brief Reports and Reviews*, 2016, **11**, 1650035.
3. G. Liu, L. Wang, H. G. Yang, H.-M. Cheng and G. Q. (Max) Lu, *J. Mater. Chem.*, 2010, **20**, 831–843.
4. B. R. Boppana and R. F. Lobo, Journal of Catalysis, 2011, 281, 156–168.

IV. Biography:

Ali Rauf has completed his PhD at the age of 29 years from Sungkyunkwan University. He is an assistant professor at department of chemistry and chemical engineering, LUMS. He has published 6 papers in reputed journals.

V. Presenting author details



Full Name: Ali Rauf
Contact number: +923074636361
Twitter account:
Linked In account: https://www.linkedin.com/in/ali-rauf-3a44253b/
Session name/ number:
Category: (Oral presentation/ Poster presentation) Oral
Passport Number: AT9984002