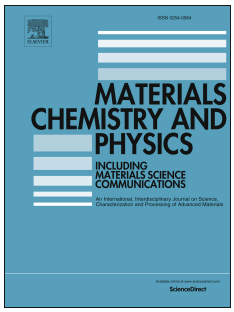
Accepted Manuscript



Zeolite nanorods decorated g-C_3N_4 nanosheets: A novel platform for the photodegradation of hazardous water contaminants

K. Prakash, S. Karuthapandian, S. Senthilkumar

PII: S0254-0584(18)30777-6

DOI: 10.1016/j.matchemphys.2018.09.026

Reference: MAC 20955

To appear in: *Materials Chemistry and Physics*

Received Date: 7 October 2017

Revised Date: 4 September 2018

Accepted Date: 8 September 2018

Please cite this article as: K. Prakash, S. Karuthapandian, S. Senthilkumar, Zeolite nanorods decorated g-C_3N_4 nanosheets: A novel platform for the photodegradation of hazardous water contaminants, *Materials Chemistry and Physics* (2018), doi: 10.1016/j.matchemphys.2018.09.026.

Zeolite nanorods decorated g-C_3N_4 nanosheets: A novel platform for the photodegradation of hazardous water contaminants

K. Prakash[†], S. Karuthapandian[†]* S. Senthilkumar[‡]

[†]*Department of Chemistry, VHNSN College, Virudhunagar-626001, Tamil Nadu, India.*
[‡]*Department of Chemistry, Ayya Nadar Janaki Ammal College, Sivakasi-626 124, Tamil Nadu, India*

Abstract

In this study, novel zeolite (H-ZSM-5) nanorods decorated graphitic carbon nitride nanosheets (H-ZSM-5/g-C_3N_4) were fabricated via simple dry synthesis technique. The as-prepared H-ZSM-5/g-C_3N_4 nanocomposite was systematically characterized by XRD, FT-IR, DRS-UV, TEM, SEM and BET and used as a visible light driven photocatalyst for the degradation of hazardous Rhodamine B (RhB) and crystal violet (CV) dyes. Interestingly, the zeolite/g-C_3N_4 nanocomposite could degrade above 99 and 98 % of RhB and CV dyes respectively. The superior photocatalytic activity of H-ZSM-5 doped g-C_3N_4 could be ascribed to the efficient separation of the photogenerated electron-hole pairs. The trapping experiment results portrayed that the superoxide radical anion ($\bullet O_2^-$) and holes (h^+) are plays major for the degradation of RhB and CV dyes. Based on the trapping experiment results, we proposed a tentative photocatalytic mechanism.

Keywords: Zeolite/g-C_3N_4, Rod-like structure, photodegradation, charge separation, Mechanism.

*Corresponding author: Dr. S. Karuthapandian

E-Mail: drpandianskvhnsnc2007@gmail.com; Tel: + 91 9486287223

*Corresponding author: Dr. S. Karuthapandian