Data in Brief 17 (2018) 842–855

Contents lists available at ScienceDirect

Data in Brief

journal homepage: www.elsevier.com/locate/dib

Data Article

Data on novel C fibers@$MoSe_2$ nanoplates core–shell composite for highly efficient solar-driven photocatalytically degrading environmental pollutants

Meng Wang [a,b,c], Zhijian Peng [a,b,*], Jingwen Qian [a,b,c], Hong Li [a,b,c], Zengying Zhao [b], Xiuli Fu [c,**]

[a] School of Engineering and Technology, China University of Geosciences, Beijing 100083, PR China
[b] School of Science, China University of Geosciences, Beijing 100083, PR China
[c] State Key Laboratory of Information Photonics and Optical Communications, and School of Science, Beijing University of Posts and Telecommunications, Beijing 100876, PR China

ARTICLE INFO

Article history:
Received 10 January 2018
Received in revised form
29 January 2018
Accepted 31 January 2018
Available online 8 February 2018

Keywords:
Environmental pollutants
Solar-driven photocatalytic degradation
$MoSe_2$ nanoplates
Carbon fiber
Composite

ABSTRACT

The data presented in this article are related to a research article entitled 'Highly efficient solar-driven photocatalytic degradation on environmental pollutants over a novel C fibers@$MoSe_2$ nanoplates core–shell composite' (Wang et al., 2018) [1]. In this article, we report original data on the synthesis processes optimization of the proposed composite together with its formation mechanism. The report includes the composition, microstructure and morphology of the corresponding samples, and the photocatalytic activity and stability of the optimal composite. Compared with commercially available $MoSe_2$ powder, the reaction rate constant of the optimal composite catalyst for the degradation of methylene blue (MB) and rhodamine B (RhB) under simulated sunlight irradiation (SSI) could be increased in a factor of about 14 and 8, respectively. The data are presented in this format to allow the comparison with those from other researchers in this field, and

DOI of original article: https://doi.org/10.1016/j.jhazmat.2018.01.013
* Corresponding author at: School of Engineering and Technology, China University of Geosciences, Beijing 100083, PR China. Fax: +86 10 82322624.
** Corresponding author. Fax: +86 10 62282242.
E-mail addresses: pengzhijian@cugb.edu.cn (Z. Peng), xiulifu@bupt.edu.cn (X. Fu).

https://doi.org/10.1016/j.dib.2018.01.103

understanding the synthesis and photocatalysis mechanism of similar catalysts.

Specifications table

Subject area	*Environmental engineering, Environmental science, Chemical engineering, Materials science, Materials engineering*
More specific subject area	*Photocatalytic degradation, New energy devices*
Type of data	*Tables, Figures*
How data was acquired	*X-ray diffraction (XRD, Rigaku D/max-RB, Japan), Field emission scanning electron microscope (FE-SEM, Quanta FEG-650, America), Photocatalytic reaction system (PCX50A Discover, Beijing Perfectlight Technology Co., Beijing, China)*
Data format	*Raw and analyzed data*
Experimental factors	*The amounts of the used reaction resources: absolute ethanol (constantly 5 mL), MoO_3 powder (1.0–1.6 g), Se powder (0.5–3.0 g), pre-oxidized polyacrylonitrile (PAN) fiber (constantly 0.15 g).Temperature: 900–1100 °C for synthesizing the photocatalystsReaction time: 1 h for synthesizing the photocatalysts*
Experimental features	*The designed experiments included the optimization of synthesis processes and comparison on the photocatalytic degradation of MB, RhB, p-chlorophenol (4-CP) and $K_2Cr_2O_7$ (Cr, VI)*
Data source location	*The composite was grown in Beijing, China*
Data accessibility	*The data are available with this article*

Value of the data

- The data on the synthesis processes optimization of the C fibers@$MoSe_2$ nanoplates core–shell composite (NPCSC) could give an insight into its formation and photocatalysis mechanisms to other researchers interested in the synthesis and application of photocatalysts.
- The data can be used by researchers interested in developing other composite photocatalysts and understanding their photocatalytic mechanism.
- The data can be used by researchers interested in developing new energy materials, and energy storage and conversion devices.

1. Data

The data presented in this paper are related to a research article entitled 'Highly efficient solar-driven photocatalytic degradation on environmental pollutants over a novel C fibers@$MoSe_2$ nanoplates core–shell composite' [1].

It includes data on the synthesis processes optimization and formation mechanism of the present C fibers@$MoSe_2$ NPCSC (Figs. 1–5), which reveal that numerous $MoSe_2$ thin nanoplates are grown in-situ, densely and even vertically on the surface of the C fibers, forming the optimal core–shell composite. Data on the photocatalytic performance and stability of the optimal composite catalyst are also presented (Figs. 6–14). In addition, data on the activity for the photodegradation of 4-CP and Cr (VI) over the present C fibers@$MoSe_2$ NPCSC and other photocatalysts are compared in Tables 1 and 2.