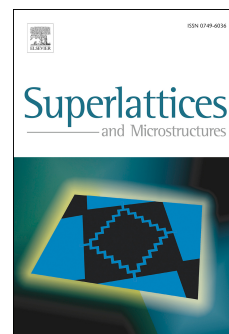


# Accepted Manuscript

Size effect on near infrared photothermal conversion properties of liquid-exfoliated MoS<sub>2</sub> and MoSe<sub>2</sub>

Yanbang Zhang, Guozhi Jia, Peng Wang, Qian Zhang, Xiaoyin Wei, Erming Dong, Jianghong Yao



PII: S0749-6036(16)31201-0

DOI: [10.1016/j.spmi.2016.11.058](https://doi.org/10.1016/j.spmi.2016.11.058)

Reference: YSPMI 4693

To appear in: *Superlattices and Microstructures*

Received Date: 13 October 2016

Revised Date: 8 November 2016

Accepted Date: 27 November 2016

Please cite this article as: Y. Zhang, G. Jia, P. Wang, Q. Zhang, X. Wei, E. Dong, J. Yao, Size effect on near infrared photothermal conversion properties of liquid-exfoliated MoS<sub>2</sub> and MoSe<sub>2</sub>, *Superlattices and Microstructures* (2016), doi: 10.1016/j.spmi.2016.11.058.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## properties of liquid-exfoliated MoS<sub>2</sub> and MoSe<sub>2</sub>

Yanbang Zhang<sup>1</sup>, Guozhi Jia<sup>\*1</sup>, Peng Wang<sup>1</sup>, Qian Zhang<sup>1</sup>, Xiaoyin Wei<sup>1</sup>, Erming Dong<sup>1</sup>, and Jianghong Yao<sup>\*2</sup>

Address: <sup>1</sup>Tianjin Chengjian University, 300384, China,

<sup>2</sup>MOE Key Laboratory of Weak-Light Nonlinear Photonics, TEDA Institute of Applied Physics and School of Physics, Nankai University, Tianjin 300457, China

\* Corresponding author Email:

Guozhi Jia\* - jiaguozhi@tcu.edu.cn;

Jianghong Yao\* - yaojh@nankai.edu.cn

### Abstract

Molybdenum disulfide and selenide (MoS<sub>2</sub> and MoSe<sub>2</sub>) have been reported as the photothermal agent due to the excellent photothermal conversion property. The MoS<sub>2</sub> and MoSe<sub>2</sub> nanoflakes water dispersion solution were synthesized via the combination technology of grinding and sonication. The different size distribution of MoS<sub>2</sub> has been selected by controlling centrifugation rate. MoS<sub>2</sub> nanoflakes exhibit better photothermal ability than MoSe<sub>2</sub> at the same concentration, while MoSe<sub>2</sub> is easier to tune the temperature changing than the MoS<sub>2</sub> by size selecting. The photothermal mechanism dependence of the lateral size and thickness is discussed based on the micro transport process. The carrier excess kinetic energy can be converted into a heat via phonon emission, which can result in more heat energy generated in the few-layer MoS<sub>2</sub> nanoflakes than in multi-layer ones.

### Keywords

2D materials; liquid exfoliation; size effect; photothermal conversion

Download English Version:

<https://daneshyari.com/en/article/7940644>

Download Persian Version:

<https://daneshyari.com/article/7940644>

[Daneshyari.com](https://daneshyari.com)