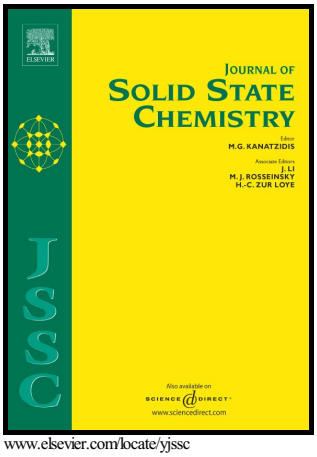
$MoO_3@SiO_2$ nanoreactors: synthesis with a thermal decomposition strategy and catalysis on alkenes epoxidation

Yirui Shen, Pingping Jiang, Yingchun Wang, Gang Bian, Phyu Thin Wai, Yuming Dong



www.elsevier.com/locate/yjssc

PII: S0022-4596(18)30183-X
DOI: https://doi.org/10.1016/j.jssc.2018.05.005
Reference: YJSSC20211

To appear in: *Journal of Solid State Chemistry*

Received date: 18 February 2018
Revised date: 17 April 2018
Accepted date: 5 May 2018

Cite this article as: Yirui Shen, Pingping Jiang, Yingchun Wang, Gang Bian, Phyu Thin Wai and Yuming Dong, $MoO_3@SiO_2$ nanoreactors: synthesis with a thermal decomposition strategy and catalysis on alkenes epoxidation, *Journal of Solid State Chemistry,* https://doi.org/10.1016/j.jssc.2018.05.005

MoO_3@SiO_2 nanoreactors: synthesis with a thermal decomposition strategy and catalysis on alkenes epoxidation

Yirui Shen, Pingping Jiang, Yingchun Wang, Gang Bian, Phyu Thin Wai, Yuming Dong*

Key Laboratory of Synthetic and Biological Colloids (Jiangnan University), Ministry of Education, School of Chemical and Material Engineering, Wuxi 214122, PR China.

*Corresponding author E-mail addresses: ppjiang@jiangnan.edu.cn.

ABSTRACT:

A general thermal decomposition strategy is reported to fabricate MoO_3@SiO_2 nanoreactors, with a mesoporous silica shell and embedded MoO_3 nanoparticles. The novel preparation procedure involves mixing certain mass ratio of $(NH_4)_6Mo_7O_{24}\cdot 4H_2O$ (AMM) and hollow mesoporous silica spheres (HMSS) by grinding, fusion and thermal decomposition of $(NH_4)_6Mo_7O_{24}\cdot 4H_2O$ under calcination and removing the residual via filtration. The as-prepared MoO_3@SiO_2 nanoreactors were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), thermogravimetric analysis (TGA), N_2 adsorption/desorption and X-ray photoelectron spectra (XPS). The nanoreactors were