

Supplementary Material (ESI) for Chemical Communications
This journal is (c) The Royal Society of Chemistry 2009

Supporting information

Visible light driven H₂ production in molecular systems employing colloidal MoS₂ nanoparticles as catalyst

Xu Zong,^a Yong Na,^b Fuyu Wen,^a Guijun Ma,^a Jinhui Yang,^a Donge Wang,^a Yi Ma,^a Mei Wang,^b Licheng Sun,^{bc} and Can Li^{*a}

^a State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, Dalian 116023, China

^b State Key Laboratory of Fine Chemicals, DUT-KTH Joint Education and Research Centre on Molecular Devices, Dalian University of Technology, Dalian 116012 China

^c Department of Chemistry, Royal Institute of Technology, Stockholm 10044, Sweden

* To whom correspondence should be addressed. Email: canli@dicp.ac.cn

Supplementary Material (ESI) for Chemical Communications
This journal is (c) The Royal Society of Chemistry 2009

Experimental details

2 wt% MoS₂/Al₂O₃ catalysts used in the reactions were prepared according to the following two methods. (1) Al₂O₃ was impregnated with (NH₄)₆Mo₇O₂₄·4H₂O aqueous solution followed by calcination at 500 °C for 4 hrs. The as prepared MoO₃/Al₂O₃ precursor was then sulfurized in a 10 vol% H₂S/H₂ (v/v) flow at 400 °C for 2 h. (2) Al₂O₃ was impregnated with (NH₄)₂MoS₄ aqueous solution followed by sulfidation in a H₂S flow at 350 °C for 2 h.

The photocatalytic reactions were carried out in a Pyrex reaction cell connected to a closed gas circulation and evacuation system. 150 ml of 2:1 acetonitrile/methanol solution containing different amounts of Ru(bpy)₃²⁺, 0.01 mol H₂A and 12.5 μmol of freshly prepared colloidal MoS₂ was used in the reactions. For comparison, K₂PtCl₄ was also used as catalyst instead of colloidal MoS₂ in the reactions. The reaction solution was thoroughly degassed and then irradiated by a Xe lamp (300 W) which is equipped with an optical filter (λ > 420 nm) to cut off the light in the ultraviolet region. The amount of H₂ produced was analyzed using an on-line gas chromatography.

Supplementary Material (ESI) for Chemical Communications
This journal is (c) The Royal Society of Chemistry 2009

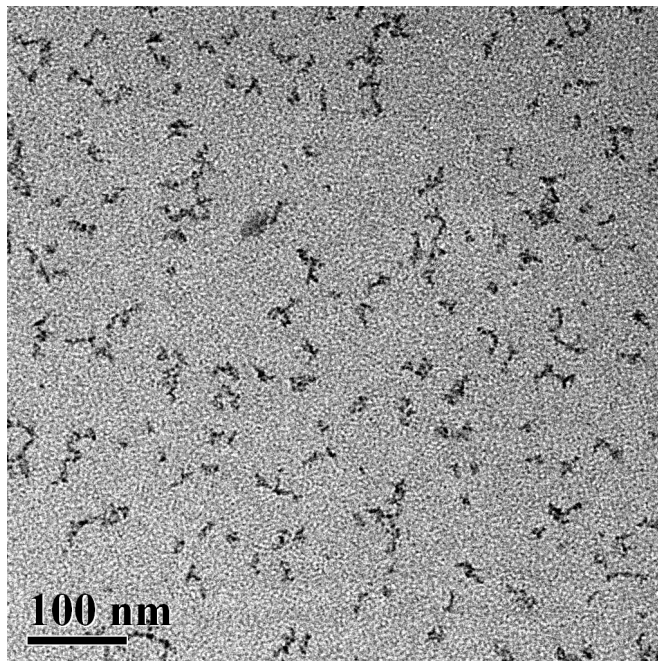


Fig. S1 TEM images of 0.15 mM colloidal MoS₂ nanoparticles prepared at 423 K.