Electronic Supplementary Material (ESI) for Journal of Materials Chemistry
This journal is © The Royal Society of Chemistry 2012

Supplementary Information

Biotemplated synthesis of highly divided MoS_2 catalysts.

*Pavel Afanasiev**, *Christophe Geantet*[a], *Isabelle Llorens*[b], *Olivier Proux*[c].

[a]Institut de Recherches sur la Catalyse et l'Environnement de Lyon IRCELYON, UMR 5256, CNRS – Université Lyon 1, 2 av A. Einstein 69626 Villeurbanne Cedex (France);

[b]Synchrotron SOLEIL – L'orme les Merisiers – F-91192 Gif sur Yvette (France);

[c]Observatoire des Sciences de l'Univers de Grenoble, UMS 832 CNRS Université Joseph Fourier F-38041 Grenoble cedex 9 (France).

E-mail: pavel.afanasiev@ircelyon.univ-lyon1.fr.

This journal is © The Royal Society of Chemistry 2012

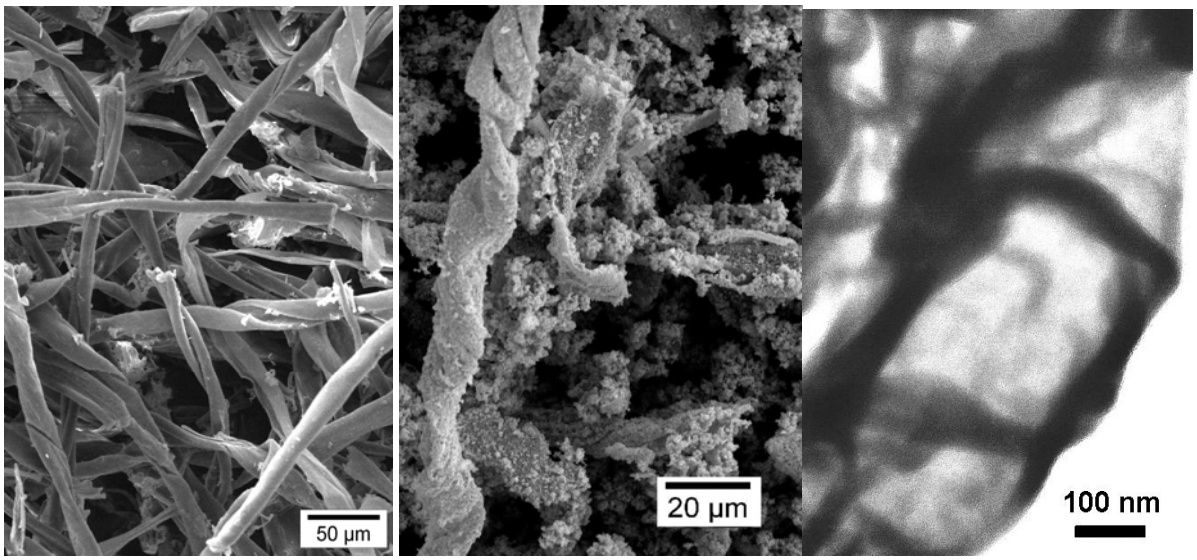


Fig. S1 SEM picture of the initial cotton fibres (left); of the solid A (middle); TEM image of the solid A representing interwoven macropores with variable walls thickness (right).

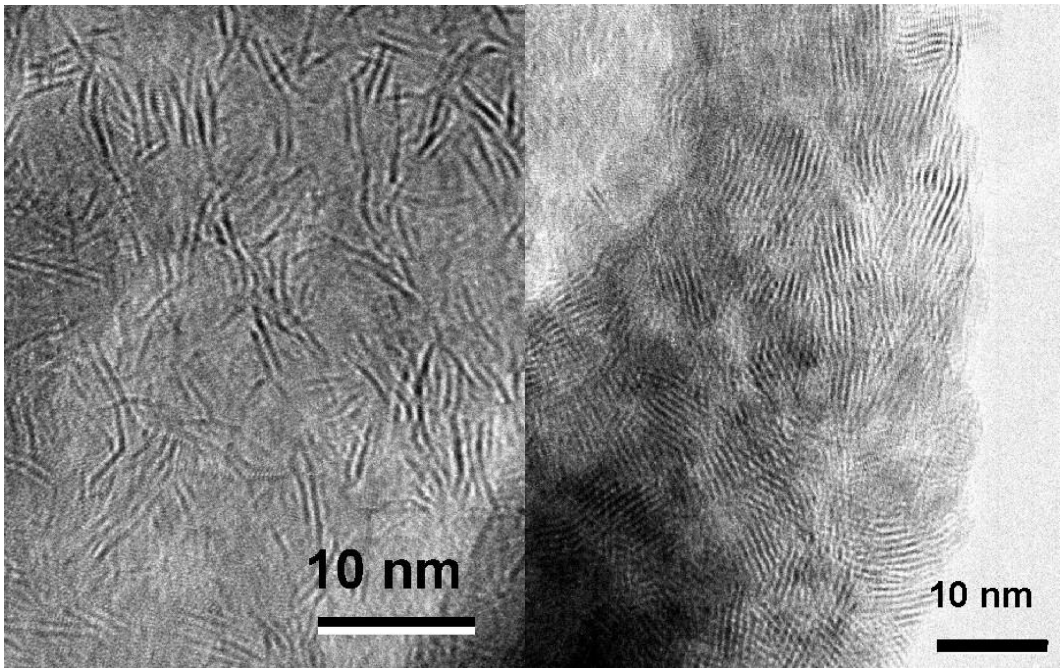
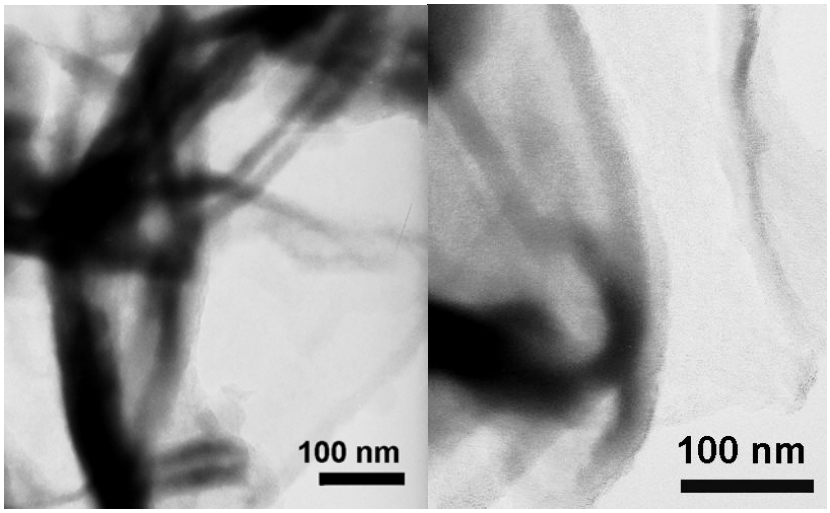


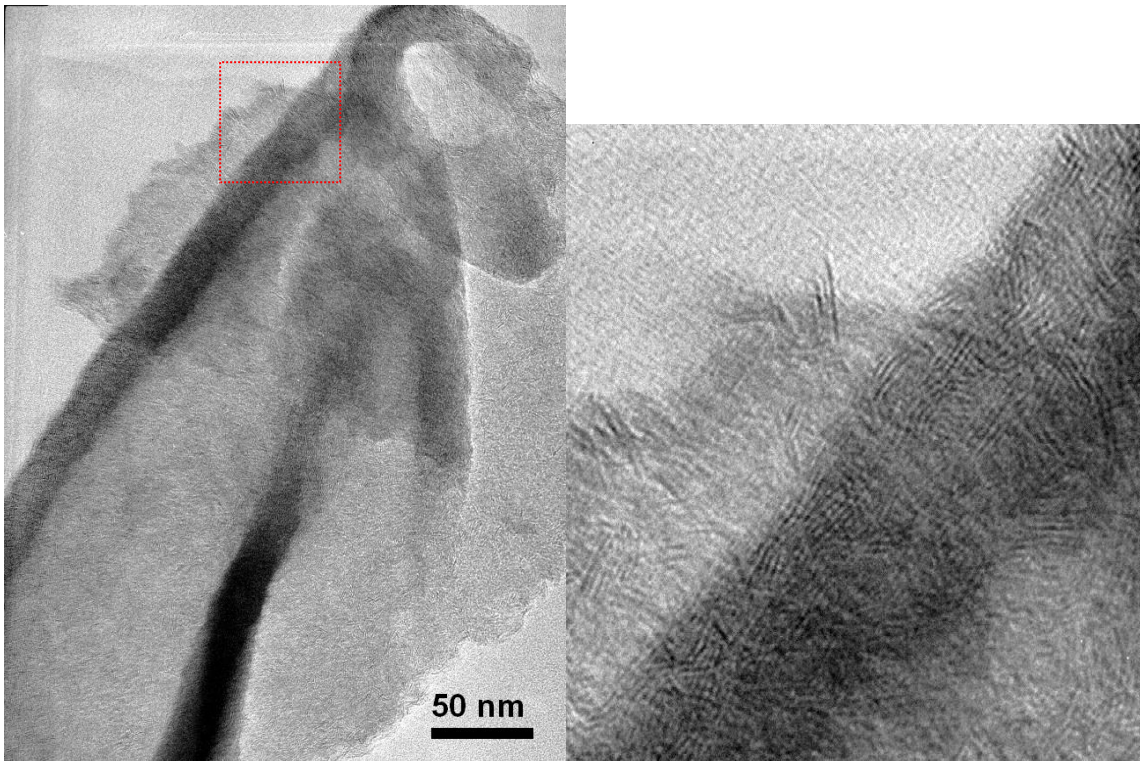
Fig S2 TEM images of the solids B (left) and E (right).

This journal is © The Royal Society of Chemistry 2012



a b

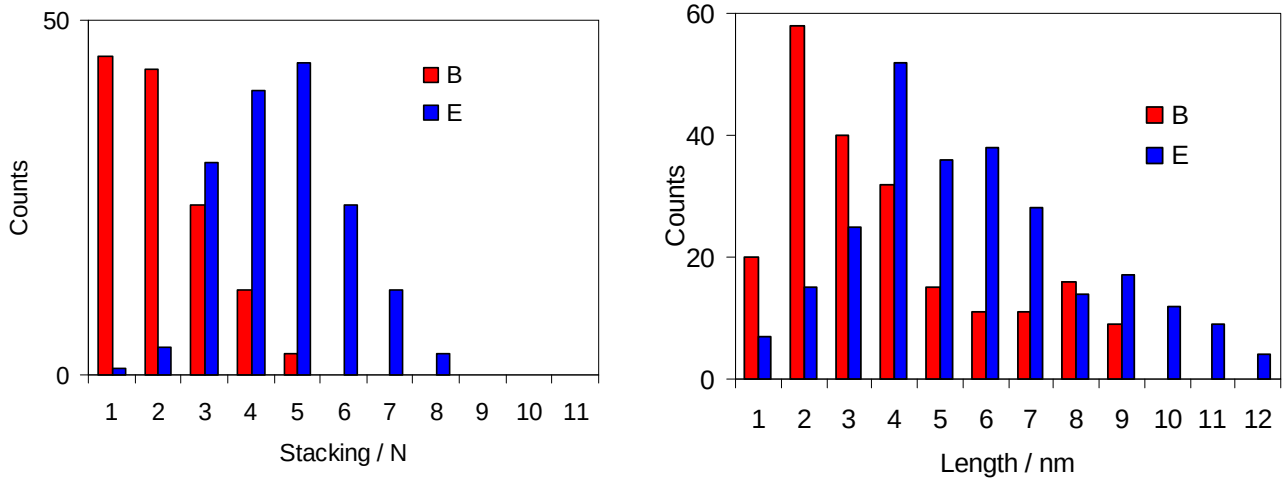
Fig. S3 low-resolution TEM images of the solid B showing different zones with typical entangled tubular morphology.



a b

Fig. S4 TEM image of a tubular fragment of solid B (a) and zoom on the area marked in a by a square, attesting that the tubule walls consist of MoS_2 slabs (b)

This journal is © The Royal Society of Chemistry 2012



a b

Fig. S5 Histograms representing the distributions of MoS_2 slabs stacking (a) and length (b) in the solid B as compared to the reference solid E. The histograms were obtained using Digital Microgtaph Gatan™ software

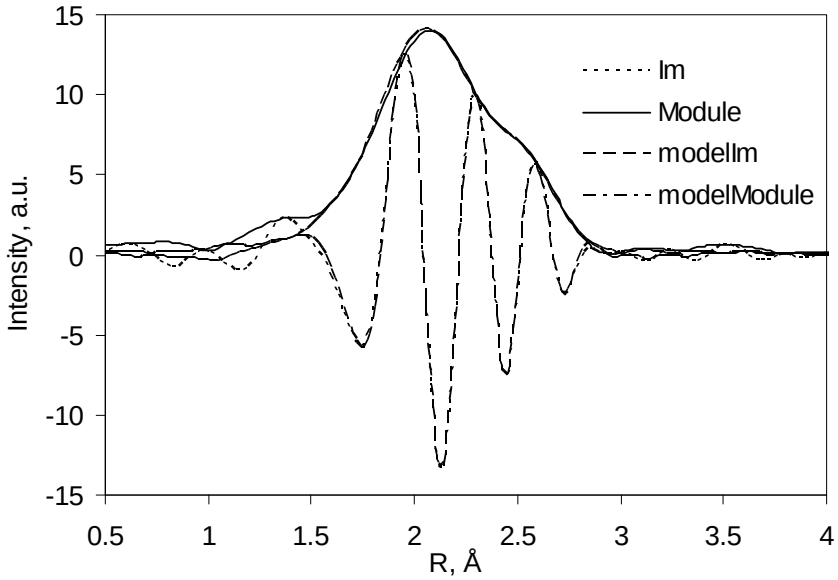


Fig. S6 R-space fit (Imaginary part and Module of Fourier transform) for the solid A. The fit was obtained using VIPER program.

This journal is © The Royal Society of Chemistry 2012

Table S1. EXAFS fitting parameters for the solids A-E

Scatterer atom	CN	R(Å)	σ^2(Å^2)	ΔE_0
		A		
S	5.8(5)	2.445(3)	0.0052(7)	-1.0(3)
Mo	1.1(2)	2.807(4)	0.0065(8)	-1.0(3)
		B		
S	3.9(3)	2.402(5)	0.0041(5)	0.0(4)
Mo	2.9(3)	3.15(1)	0.0054(6)	0.0(4)
		C		
S	6.0(5)	2.451(5)	0.0048(4)	-0.6(3)
Mo	1.2(2)	2.810(5)	0.0058(5)	-0.6(3)
		D		
S	4.4(4)	2.414(4)	0.0042(4)	-0.8(4)
Mo	3.0(3)	3.15(1)	0.0042(4)	-0.8(4)
		E		
S	5.1(4)	2.420(3)	0.0039(4)	-0.3(3)
Mo	3.5(5)	3.155(5)	0.0043(4)	-0.3(3)

This journal is © The Royal Society of Chemistry 2012

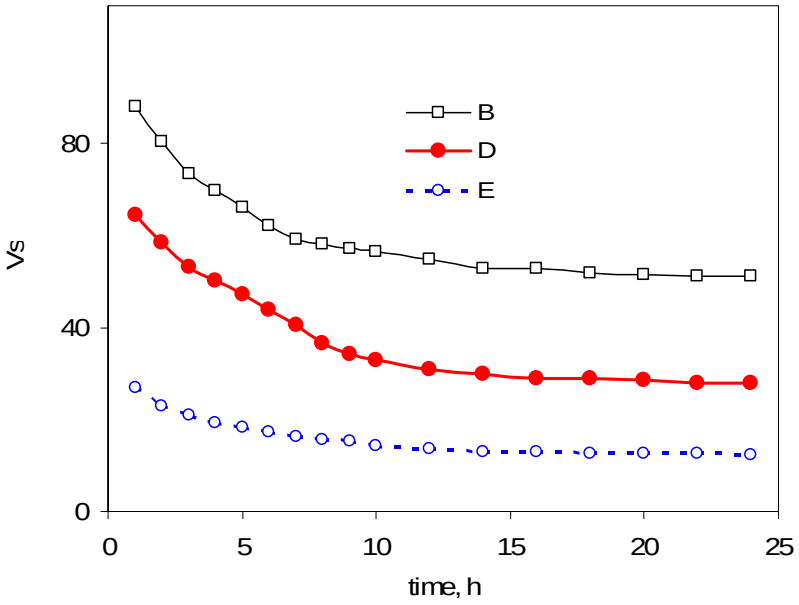


Figure S7 Time evolution of the specific rate of thiophene HDS, measured at 300°C (Vs, 10^{-8} mol.$g^{-1}s^{-1}$).

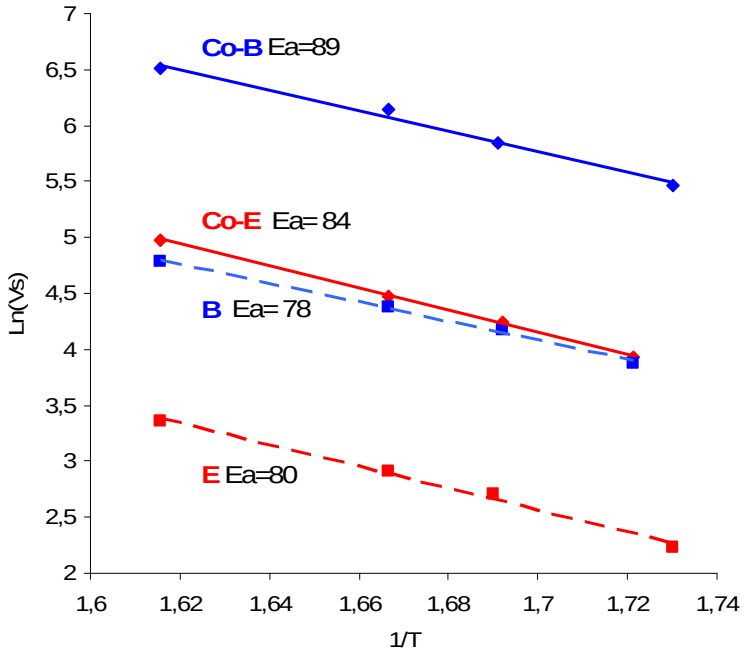


Figure S8. Arrhenius plots of thiophene HDS specific rate (Vs, 10^{-8} mol.$g^{-1}s^{-1}$) for the non-promoted (B, E) and Co-promoted (Co-B, Co-E) catalysts. Activation energies (Ea, kJ/mol) are indicated in the legends.

This journal is © The Royal Society of Chemistry 2012

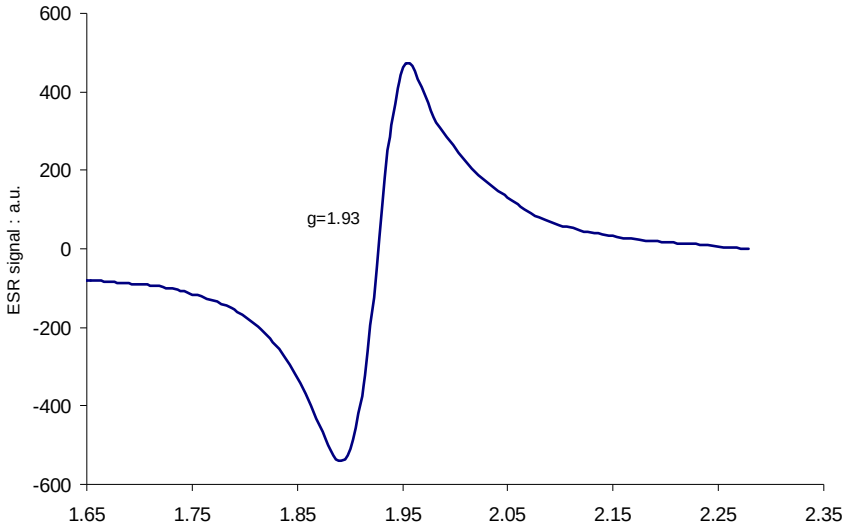


Figure S9. X-band EPR signal for the solid obtained from the reflux in EG of cellulose and ammonium heptamolybdate. The spins concentration estimated from double integration and comparison with Varian strong pitch is 0.51×10^{21} spin.g^{-1}