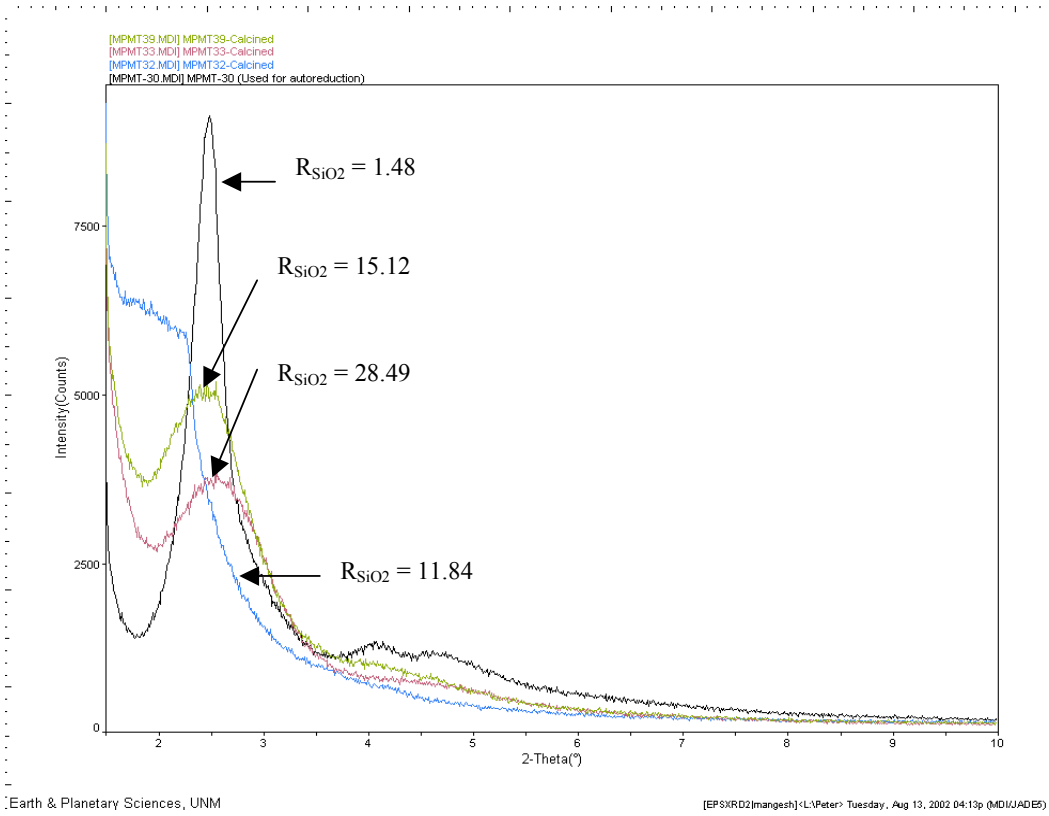
APPENDICES

Appendix A.1

The XRD patterns of Si-MCM-41 materials prepared at 80 ^{o}C for 6 h under magnetic stirring. The ratio R_{SiO2} represents mol_{SiO2}(TEOS) divided by mol_{SiO2}(water-glass) in the synthesis gel.



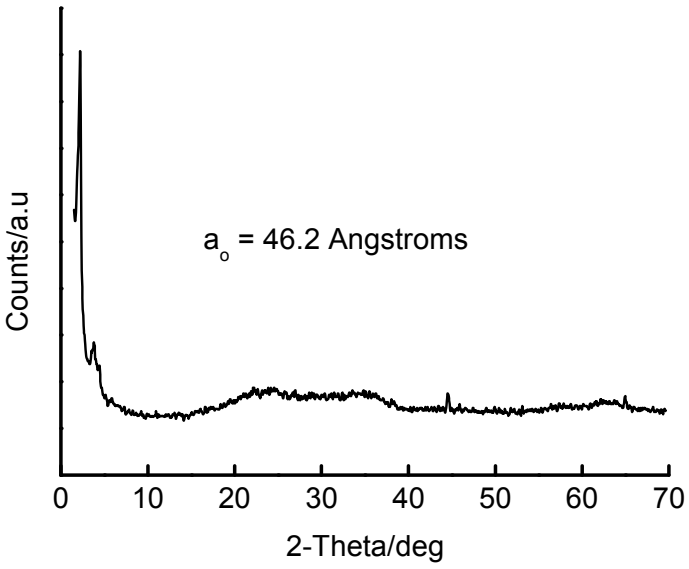
Appendix A.2

Table of lattice parameters of Si-MCM-41 (prepared at 100 ^{o}C for 2 days) as a function of the synthesis gel H_2O content

H_2O content/ml	H_2O/SiO_2 mol ratio	d_{100}/Å	a_o/Å	$S_{BET}/m^2.g^{-1}$
135	63	40.4922	46.8	988
155	72.4	40.5853	46.9	-
200	93.4	40.3073	46.5	993
260	121.4	40.6788	47.0	-

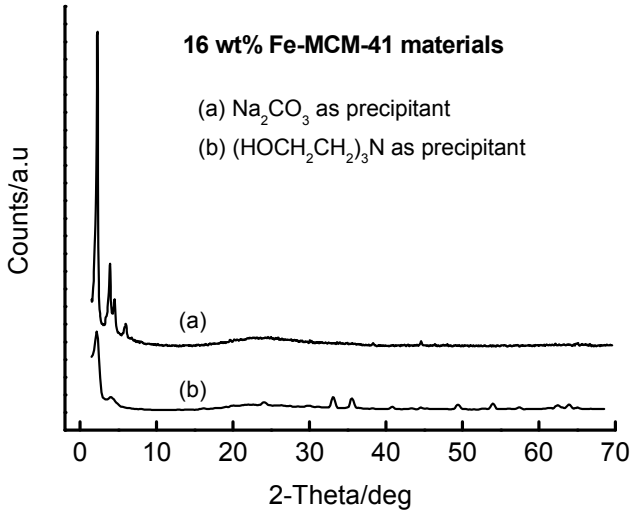
Appendix A.3

XRD pattern of 20 wt% Fe-MCM-41 prepared at 100 ^{o}C for 2 days via the OH^- precipitate route



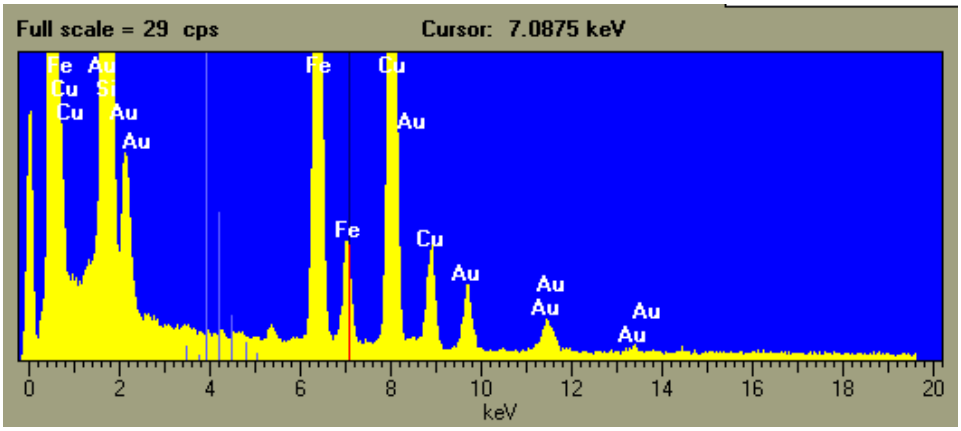
Appendix A.4

XRD patterns of 16 wt% Fe-MCM-41 (100 ^{o}C, 2 d) using different precipitants (TEA and Na_2CO_3).



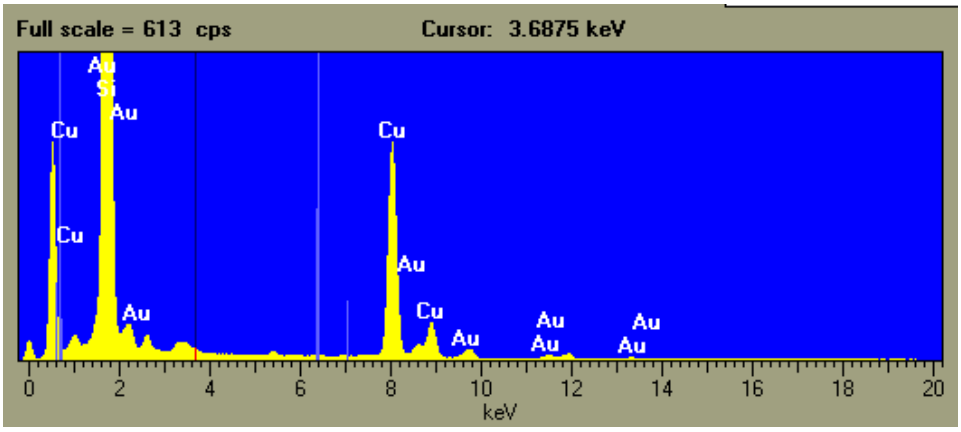
Appendix A.5 (i)

The EDS spectrum of 5 wt% Au/14 wt% Fe-MCM-41 prepared via the (en) route on the Fe-rich support, followed by calcination at 380 ^{o}C for 6 h. Average particle size 3.55 nm.



Appendix A.5 (ii)

EDS spectrum of 2.28 wt% Au/CTAB-MCM-41 prepared via the en route, and then calcined at 500 ^{o}C for 12 h to decompose the surfactant. Note that the Au content is relative to the as-synthesized material, and the actual Au content is actually higher than the stipulated value.



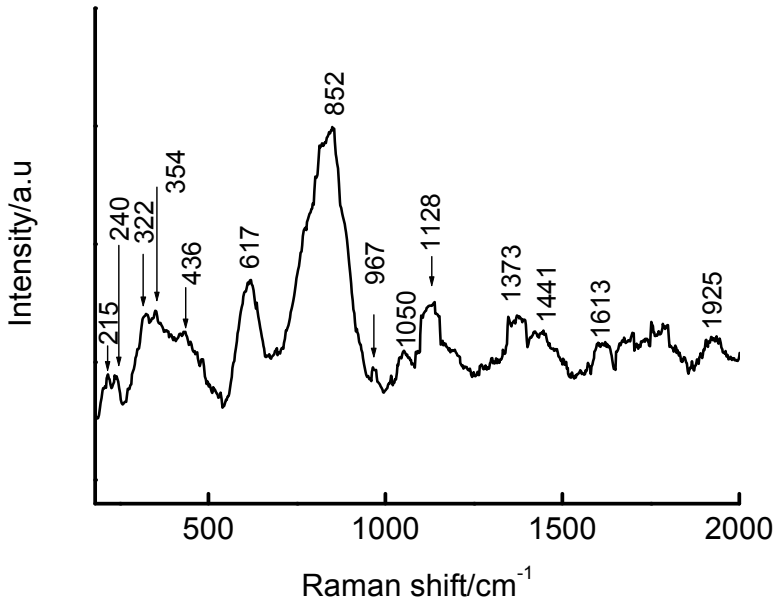
Appendix A.6

Raw data for the CO oxidation reaction using 1.48 wt% Au.Co-MCM-41 as a catalyst, calcined at 325 ^{o}C for 6 h

Temp (^{o}C)	CO area	CO_2 area	CO_2/CO ratio	Conversion	Moles of CO_2/s.g Au	Moles of CO_2/s.g Cat
50	186073	0	0	0	0	0
99	184675	1350	0.004548	0.452721	0.000162	5.18929E-07
131	182936	7085	0.024094	2.352755	0.000843	2.69683E-06
150	179181	12058	0.041866	4.018348	0.001439	4.60601E-06
200	32957	250392	4.7266	82.53763	0.029565	9.46083E-05
225	23857	260675	6.797662	87.17564	0.031226	9.99246E-05
250	9971	282091	17.60056	94.62382	0.033894	0.000108462
299	0	299043	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Appendix A.7

The framework Raman spectrum of *sec*-Si-MCM-41 prepared at 100 ^{o}C for 48 h and then calcined at 560 ^{o}C for 6 h



Appendix A.8

Conferences Attended and Presentations

1. CATSA (in honour of Prof. M. E. Dry). 5 – 8 November 2000, Berg-en-dal Camp, Kruger national Park, South Africa. *MCM-41 as a Possible Support for Fischer-Tropsch Catalysts* by M. P. Mokhonoana and N. J. Coville.

2. CATSA/SACI 2001, Pilanesburg, South Africa, 4-8 November 2001. *Synthesis and Characterization of Me/MCM-41 (Me = Si, Fe, Co, Ru)* by M. P. Mokhonoana and N. J. Coville.

3. Gordon Research Conference on Catalysis, June 23-28, 2002, Colby-Sawyer College, New London, New Hampshire, USA. *Au Catalysts on Fe-Modified Mesoporous Silica* by M. P. Mokhonoana, N. J. Coville, M. Bore, H. Pham and A. K. Datye.

4. CATSA Conference 2002, 10-13 November 2002, President Hotel, Cape Town, South Africa. *Supported Au Catalysts for CO Oxidation* by M. P. Mokhonoana, N. J. Coville, J. Yang and H. H. Kung.

5. Interscience Conference 2003, 1-3 November 2003, University of the North, Pietersburg, South Africa. *Characterization of Fe- and Co-MCM-41 Supports for Au Catalysts* by M. P. Mokhonoana, N. J. Coville and A. K. Datye.

6. CATSA Conference 2003, Riverside Hotel, Durban, South Africa. *Premodification of MCM-41 for Au Supported Catalysts* by M. P. Mokhonoana, N. J. Coville and A. K. Datye.

7. 14th International Zeolite Conference, 25-30 April 2004, Cape Town International Convention Centre, Cape Town, South Africa. *Gold Catalysts Supported on Fe- and Co-MCM-41* by M. P. Mokhonoana, N. J. Coville and A. K. Datye.

Workshop Attended and Presentations

1. Western States Catalysis Club Symposium, Wyndham Hotel, Albuquerque, New Mexico, USA, 22 February 2002. *Preparation of Highly Dispersed Fe in MCM-41*

2. NSF-NRF Workshop on Catalysis by Gold, 21-23 June 2002, Holiday Inn, Boston, MA. USA. *Au Catalysts on Fe-Modified Mesoporous Silica*

3. NSF-NRF Workshop on Catalysis by Gold, 18-21 July 2003, Mt. Grace Hotel, Magaliesburg, South Africa. *Characterization of Fe- and Co-MCM-41 Materials*

4. NSF-NRF Workshop on Catalysis by Gold, 17-19 July 2004, IBIS Paris Berthier Porte de Clichy 17e, Paris, France. *The Future of Gold Catalysis*

Publications

1. M. P. Mokhonoana, N. J. Coville and A. K. Datye, **Gold Catalysts Supported on Fe- and Co-MCM-41**, *Studies in Surface Science and Catalysis*, Accepted (2004).