Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

(**Supporting Information**)

Highly efficient and straightforward functionalization surface through thiol-ene click chemistry

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Kinetics profile of Figure 4 established with Infrared spectroscopy (FTIR-ATR).

The kinetics profile was established using FTIR spectra of ene-functionalized cellulose films before (MFC-Vi) and after "click" derivatization (MFC-Vi-S_x). Several peaks were of interests, namely the carbonyl peak at 1733 cm^{-1}, the vinyl peaks at 1601 $cm^{-1}$and 1409 cm^{-1}, the C-H deformation band at 1436 cm^{-1}, the C-O stretching vibration at 1276 cm^{-1} and the band associated with the C-O and Si-O-Si stretching vibrations, at about 1001 cm^{-1}.

Spectra were first normalized to the band at 1001 cm^{-1}, and a linear baseline correction was then applied on all spectra using five points located at 3700, 2400, 1800, 1500, 1220 and 808 cm^{-1}. In each spectrum, the peak heights at 1733 (I_{1733}), 1601 (I_{1601}) , 1436 (I_{1436}), 1409 (I_{1409}), 1276 (I_{1276}) and 1001 cm^{-1} (I_{1001}) were calculated using baselines constructed by extrapolating lines between 1800 and 1500 cm^{-1} to calculate I_{1733} and I_{1601}, between 1500 and 1220 cm^{-1} to calculate I_{1436}, I_{1408} and I_{1276}, and between 1220 and 808 cm^{-1} to calculate I_{1001}. The kinetics of the reaction was determined by calculating the peak height ratios I_{1733}/I_{1001}, I_{1601}/I_{1001}, I_{1436}/I_{1001}, I_{1409}/I_{1001}, I_{1276}/I_{1001}, and plotting them against reaction time.

Kinetics profile of Figure 7 established with Infrared spectroscopy (FTIR-ATR).

The kinetics profile was established using FTIR spectra of thiol-functionalized cellulose films before (MFC-SH) and after "click" derivatization (MFC-S-AlB_x). Spectra were first normalized to the band at 1001 cm^{-1}, and a linear baseline correction was then applied on all spectra using five points located at 3700, 2400, 1900, 1500, 1220 and 826 cm^{-1}.

The peak heights ratio of 1730 to 996 cm^{-1} vibrations (I_{1730}/I_{996}) in each spectrum was calculated using a baseline constructed by extrapolating two lines between the valleys at 1900 and 1500 cm^{-1} and between the valleys at 1220 and 826 cm^{-1}. The kinetics of the reaction was determined by plotting the ratio I_{1730}/I_{996} against reaction time.

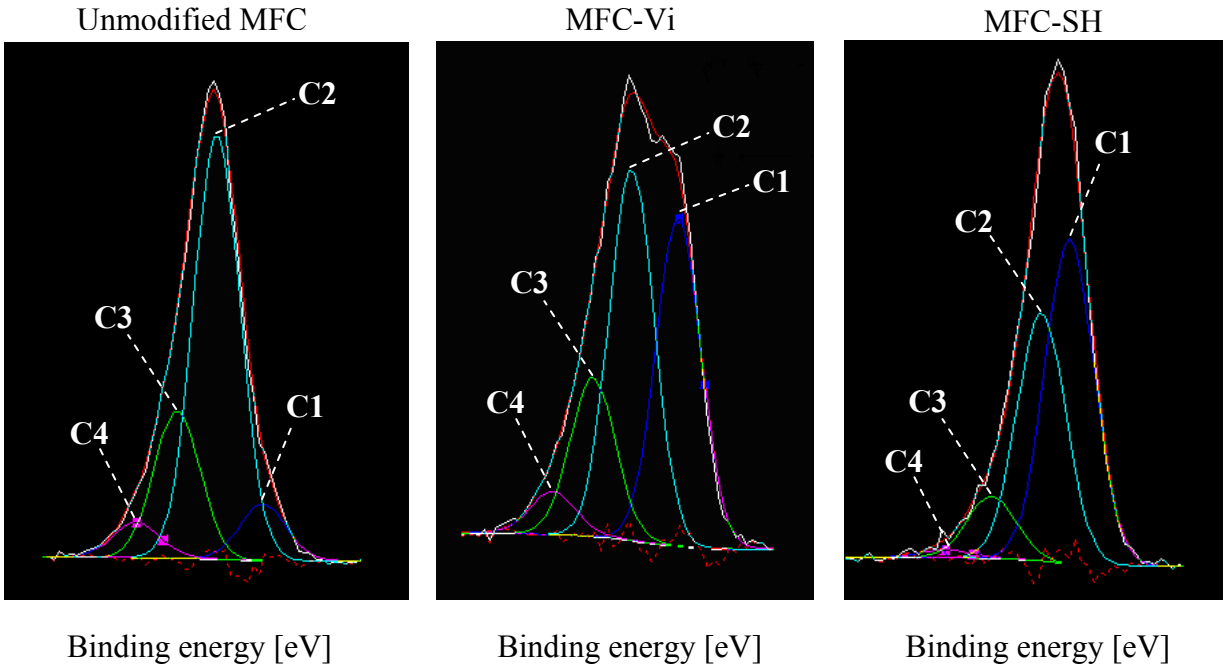


Figure S1. Deconvolution of C_{1s} high resolution signal of unmodified MFC, MFC-Vi and MFC-SH.

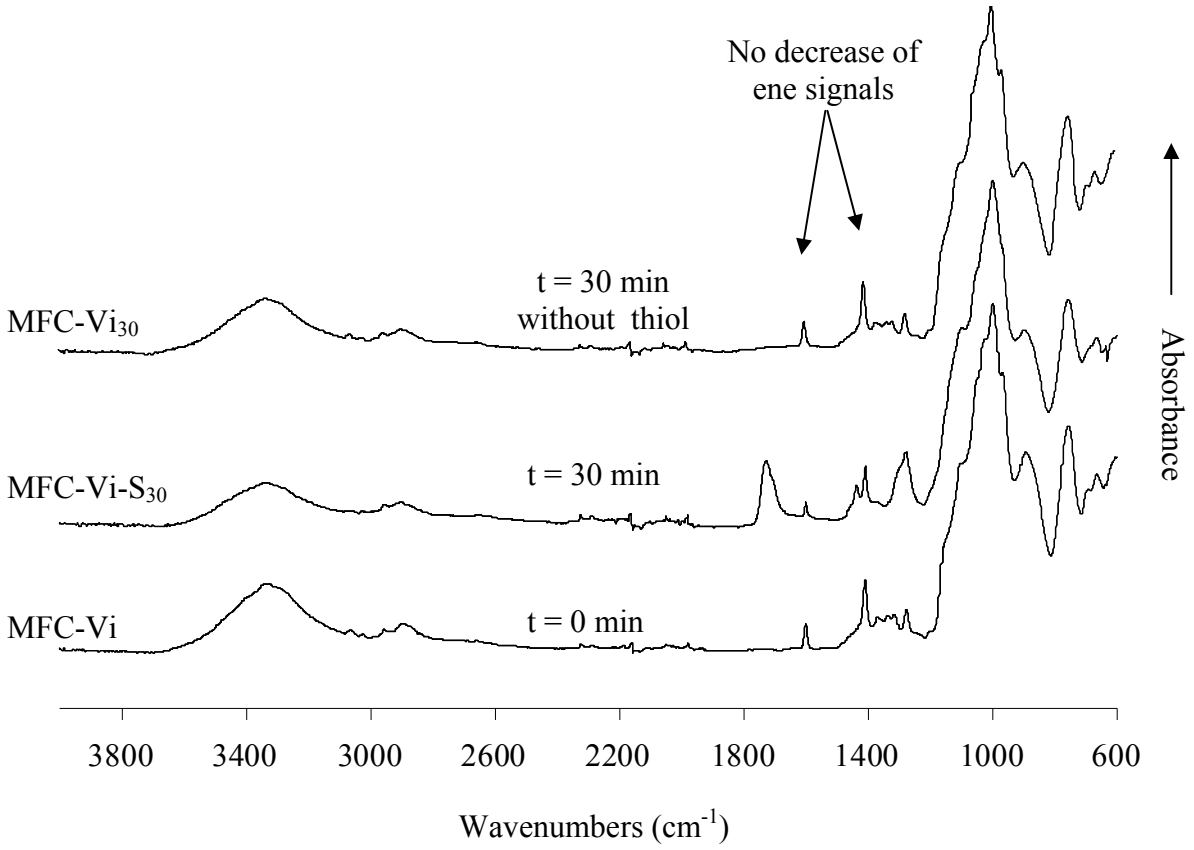


Figure S2. FTIR absorbance spectra of MFC-Vi (t = 0 min), MFC-Vi-S_{30} and MFC-Vi after 30 min reaction time without thiol (MFC-Vi_{30}).

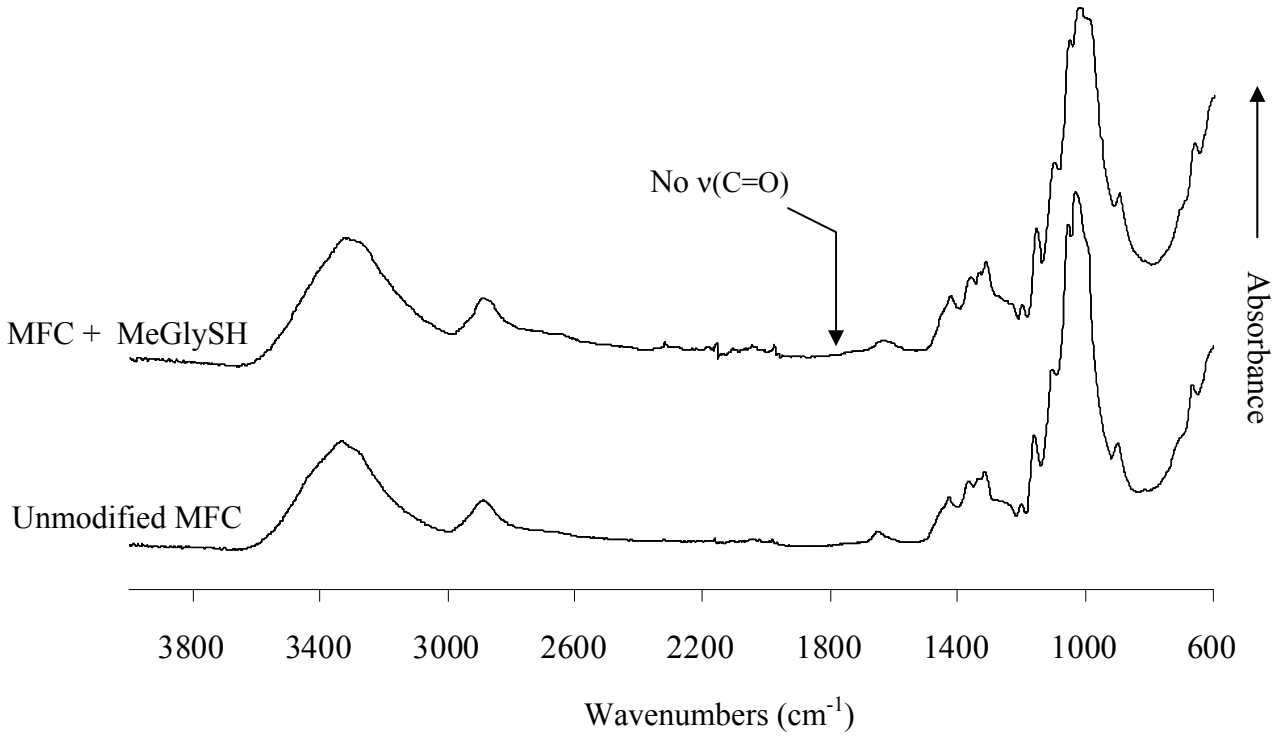


Figure S3. FTIR absorbance spectra of unmodified MFC and MFC reacted with MeGlySH for 30 min.

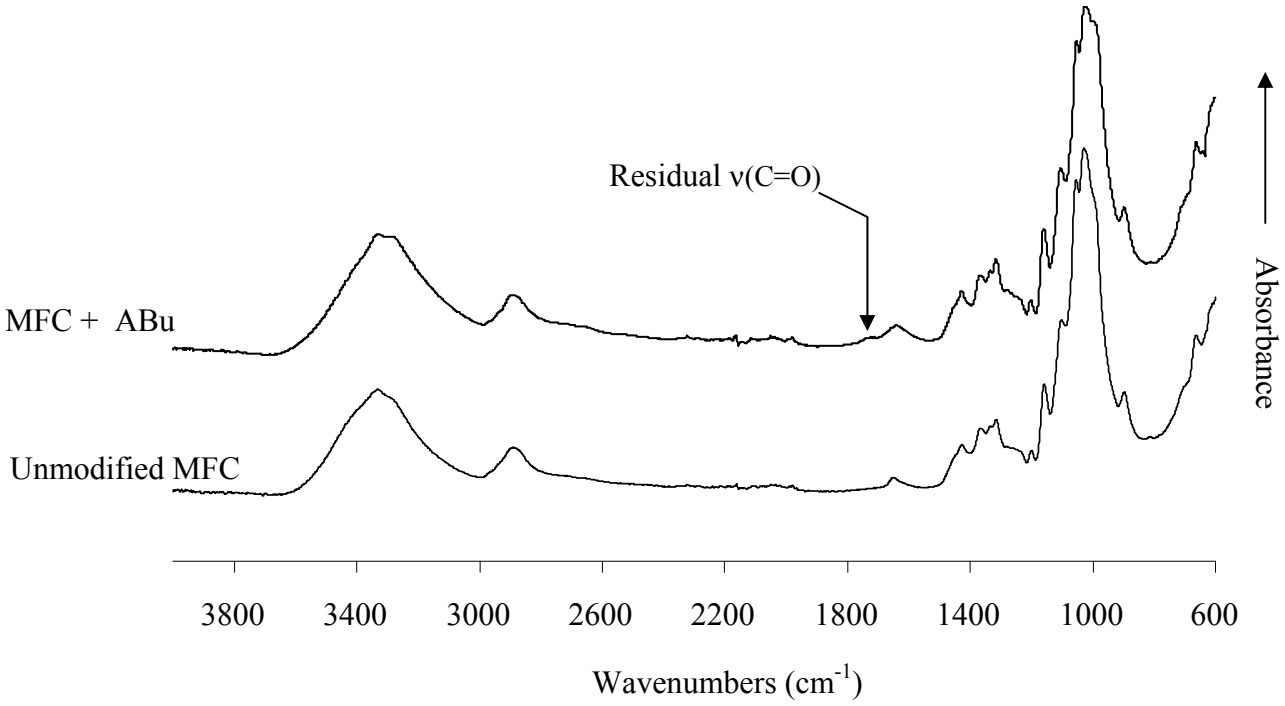
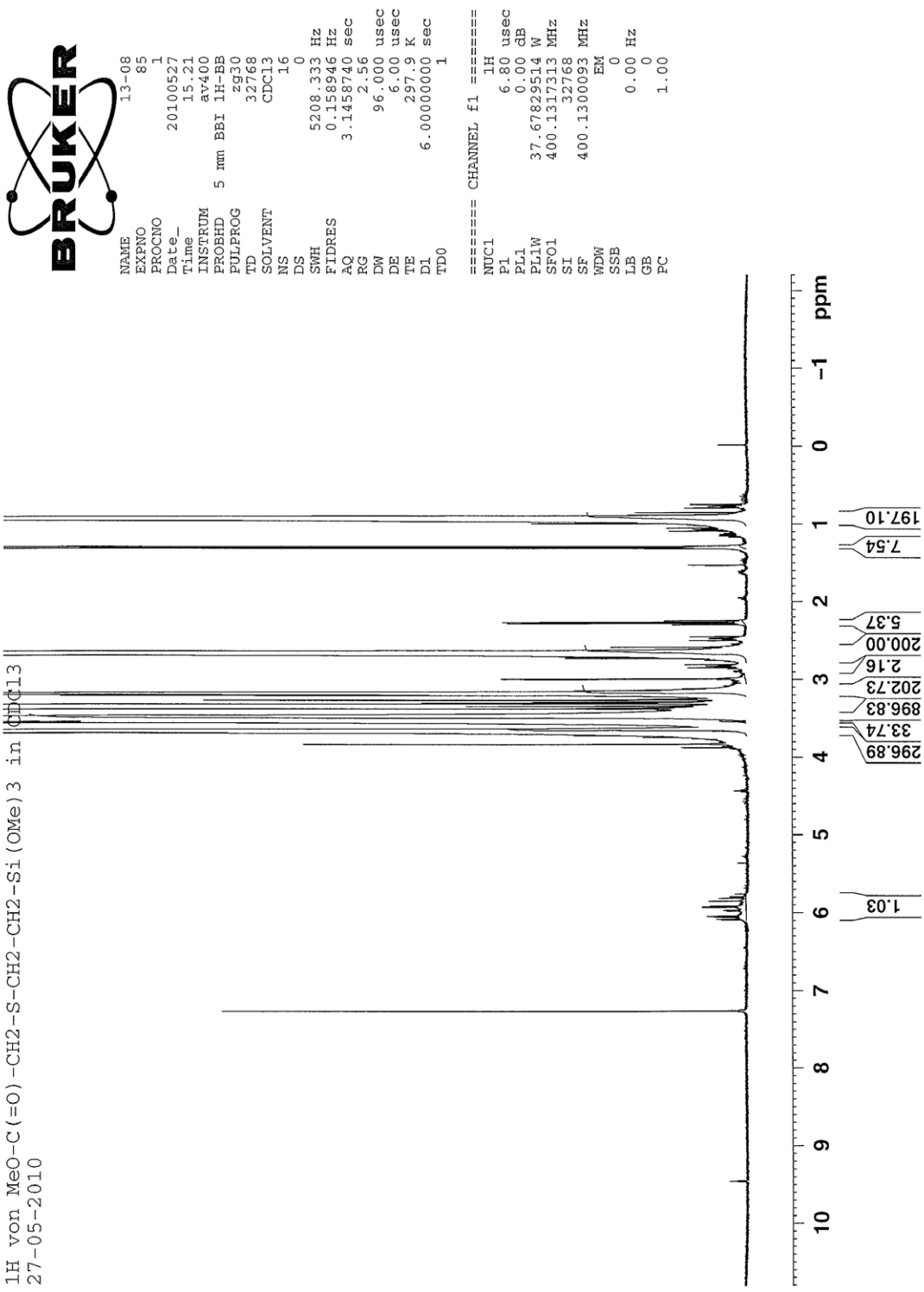
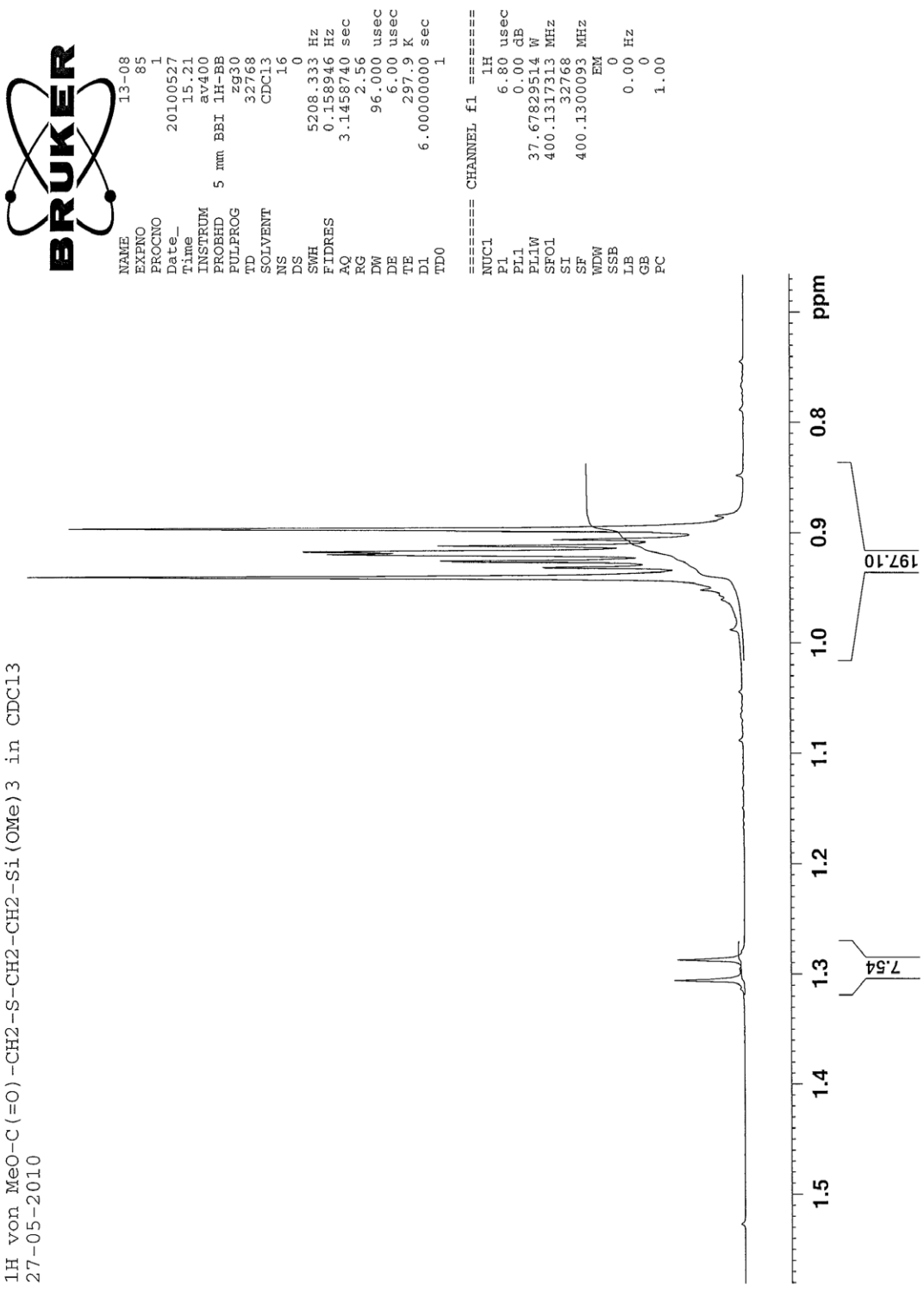
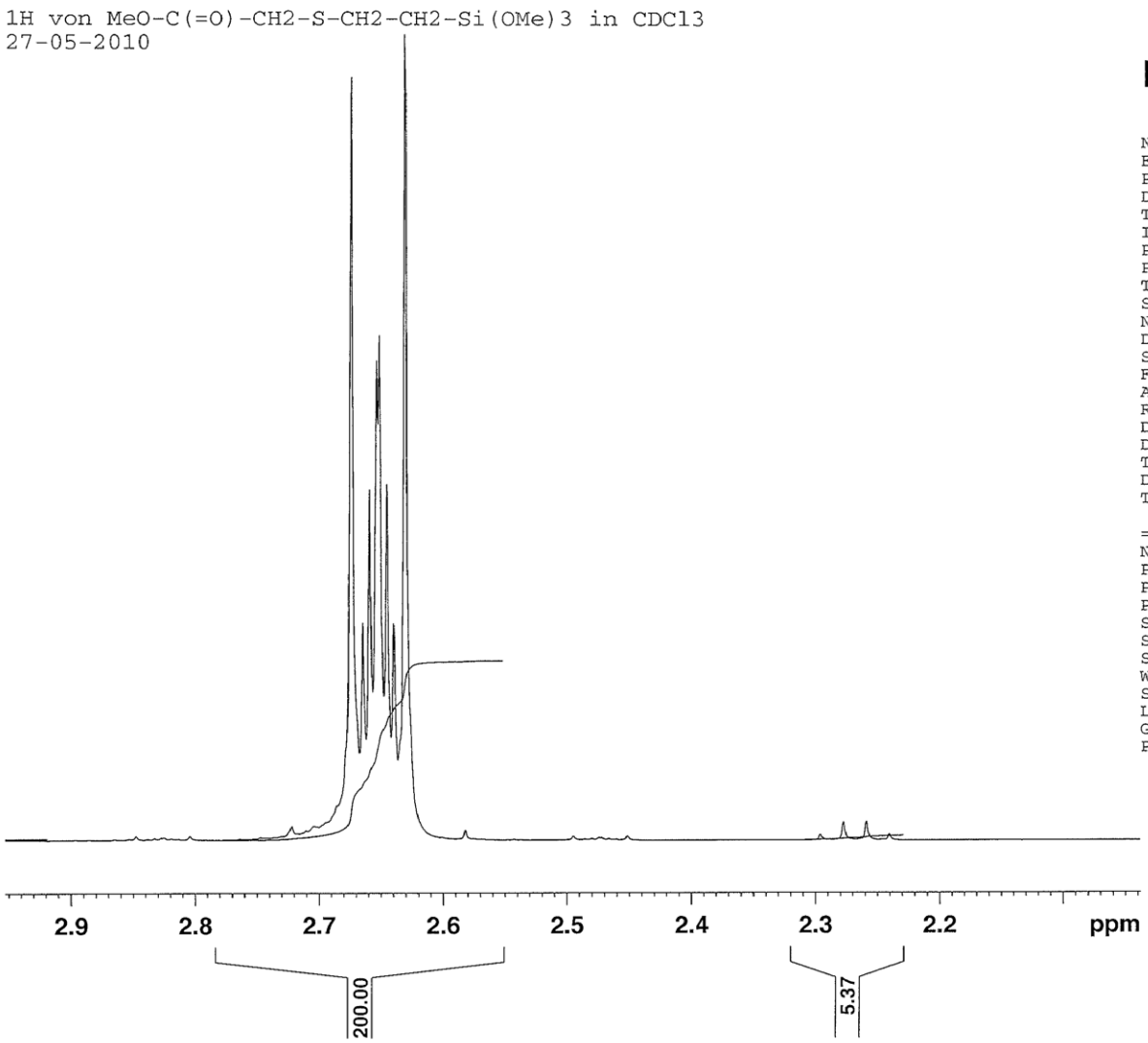


Figure S4. FTIR absorbance spectra of unmodified MFC and MFC reacted with **ABu** for 120 min.







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SOLVENT	CDCl3	
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RG	2.56	
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TE	297.9	K
D1	6.00000000	sec
TD0	1	
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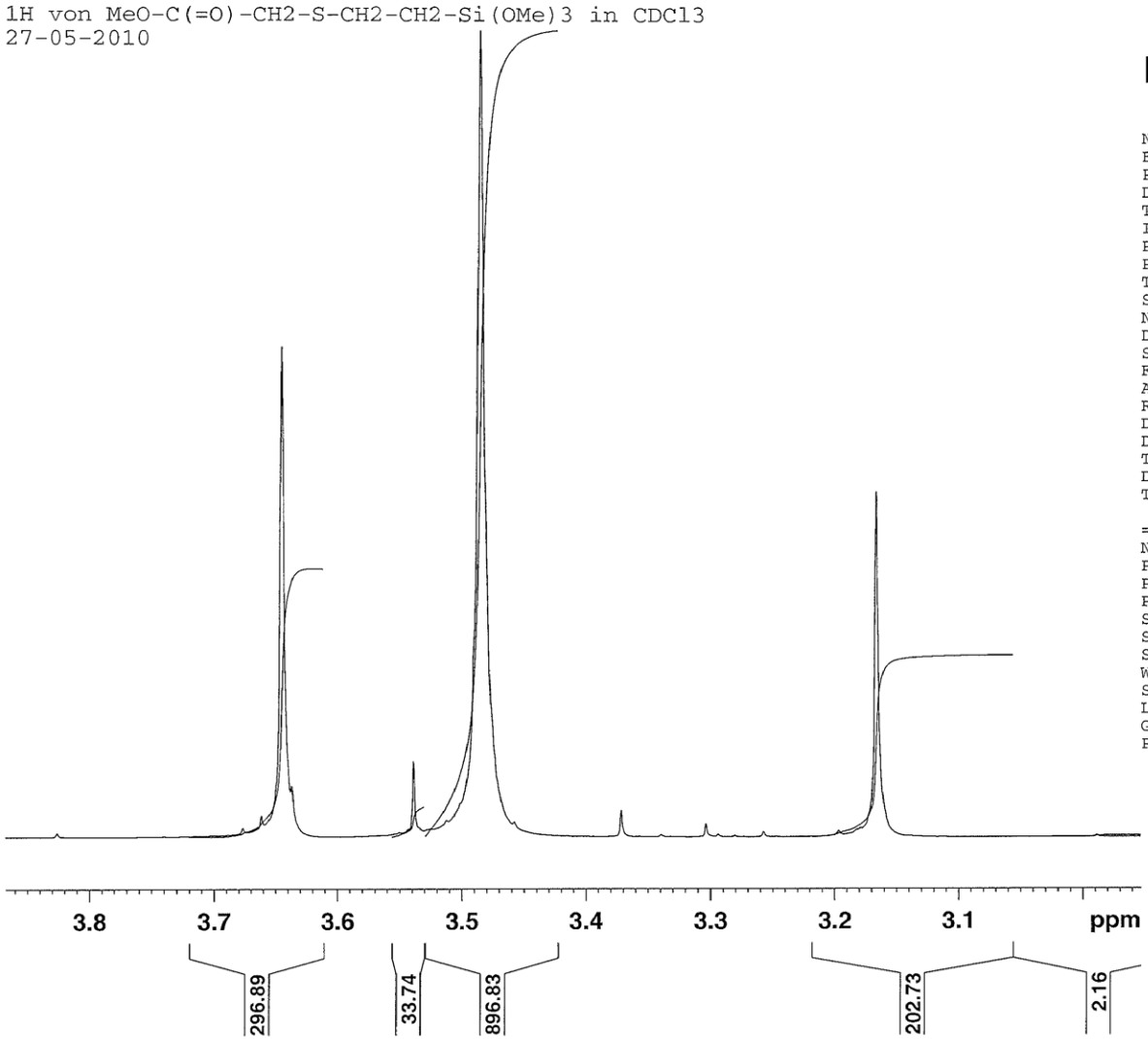

BRUKER

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Time	15.21	
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DE	6.00	usec
TE	297.9	K
D1	6.00000000	sec
TD0	1	
======== CHANNEL f1 ========		
NUC1	1H	
P1	6.80	usec
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PL1W	37.67829514	W
SFO1	400.1317313	MHz
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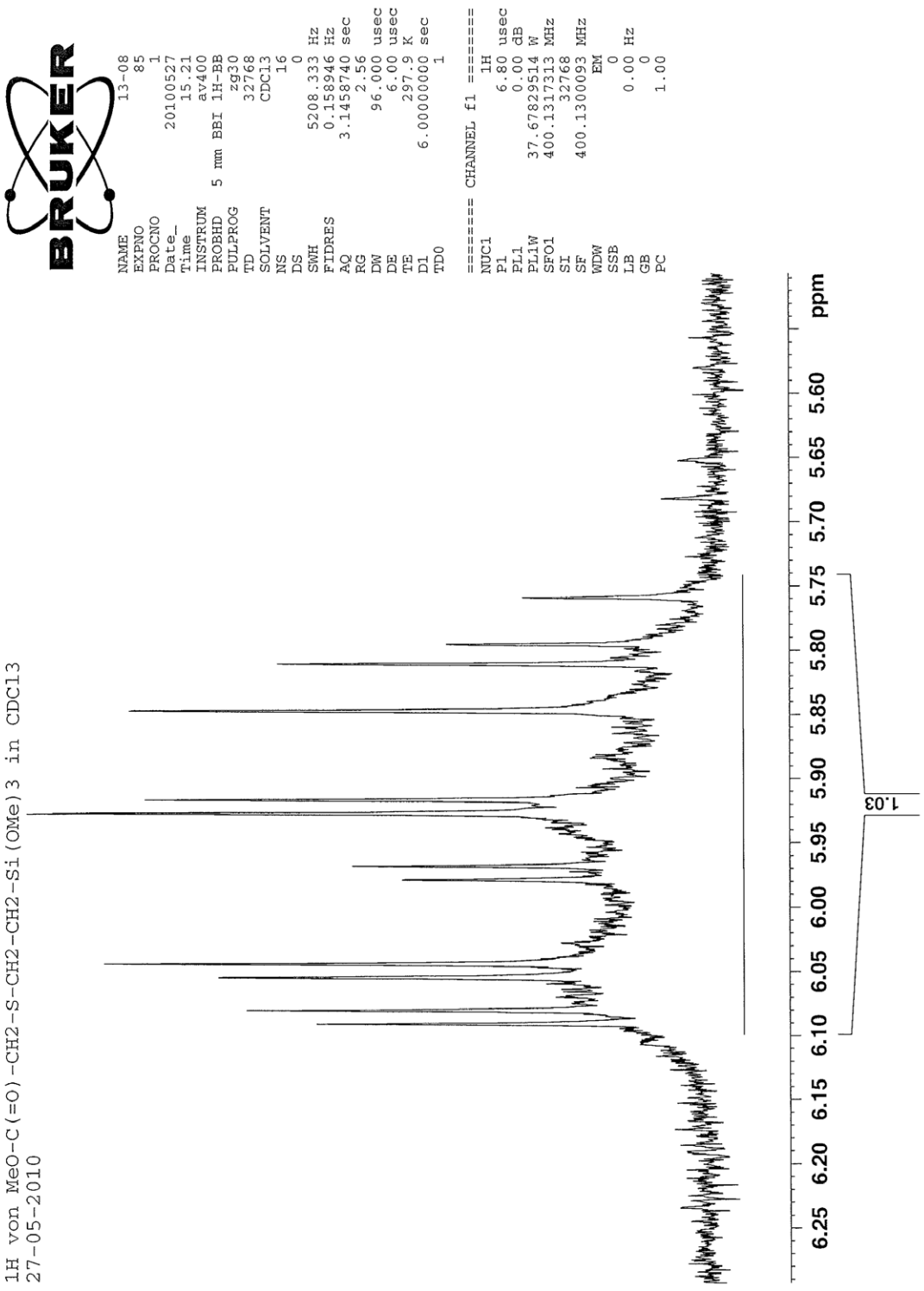

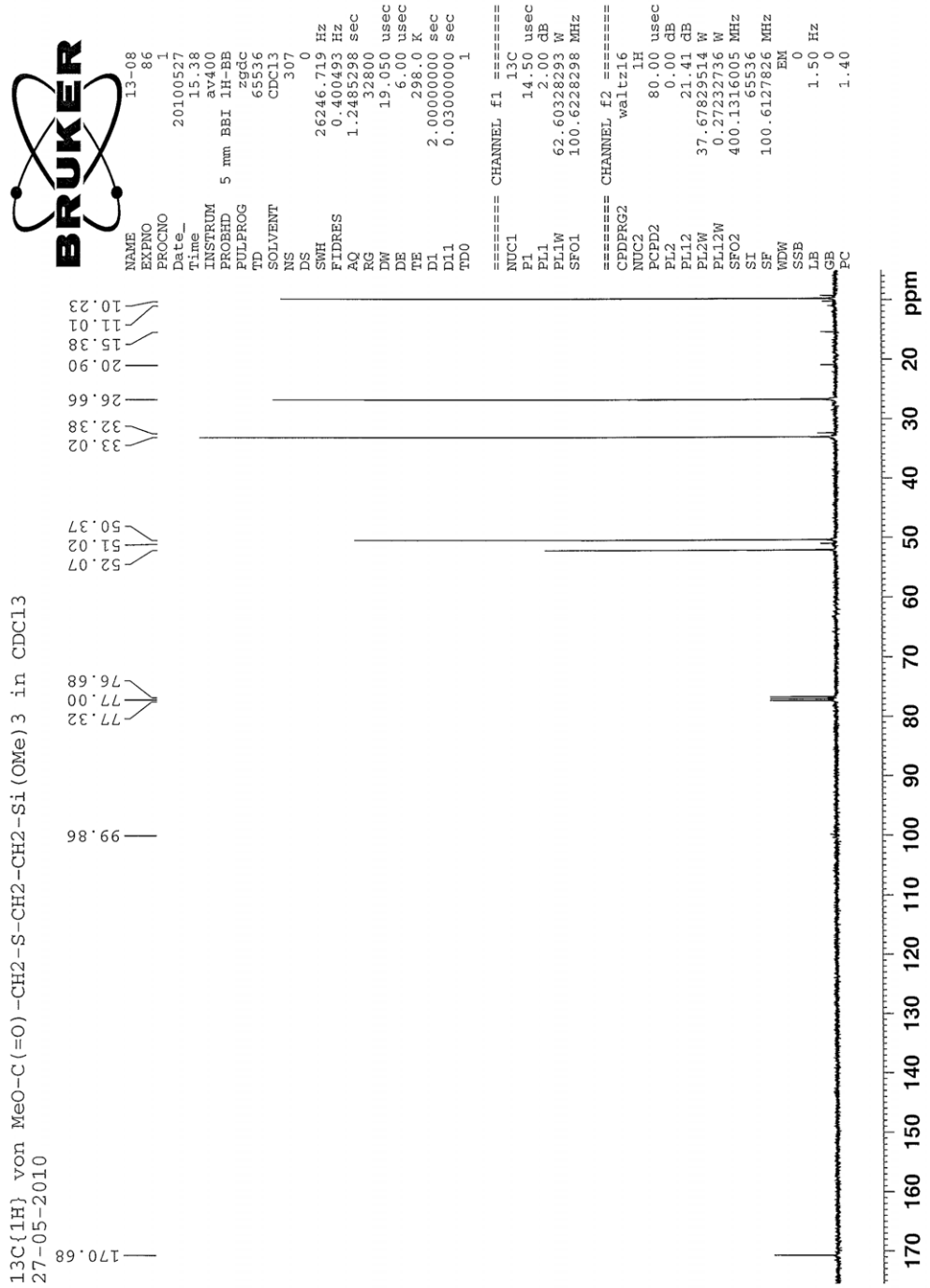

Figure S5. ^{1}H and ^{13}C NMR spectra of **1**. The chemical shifts are in agreement with the literature.[1]

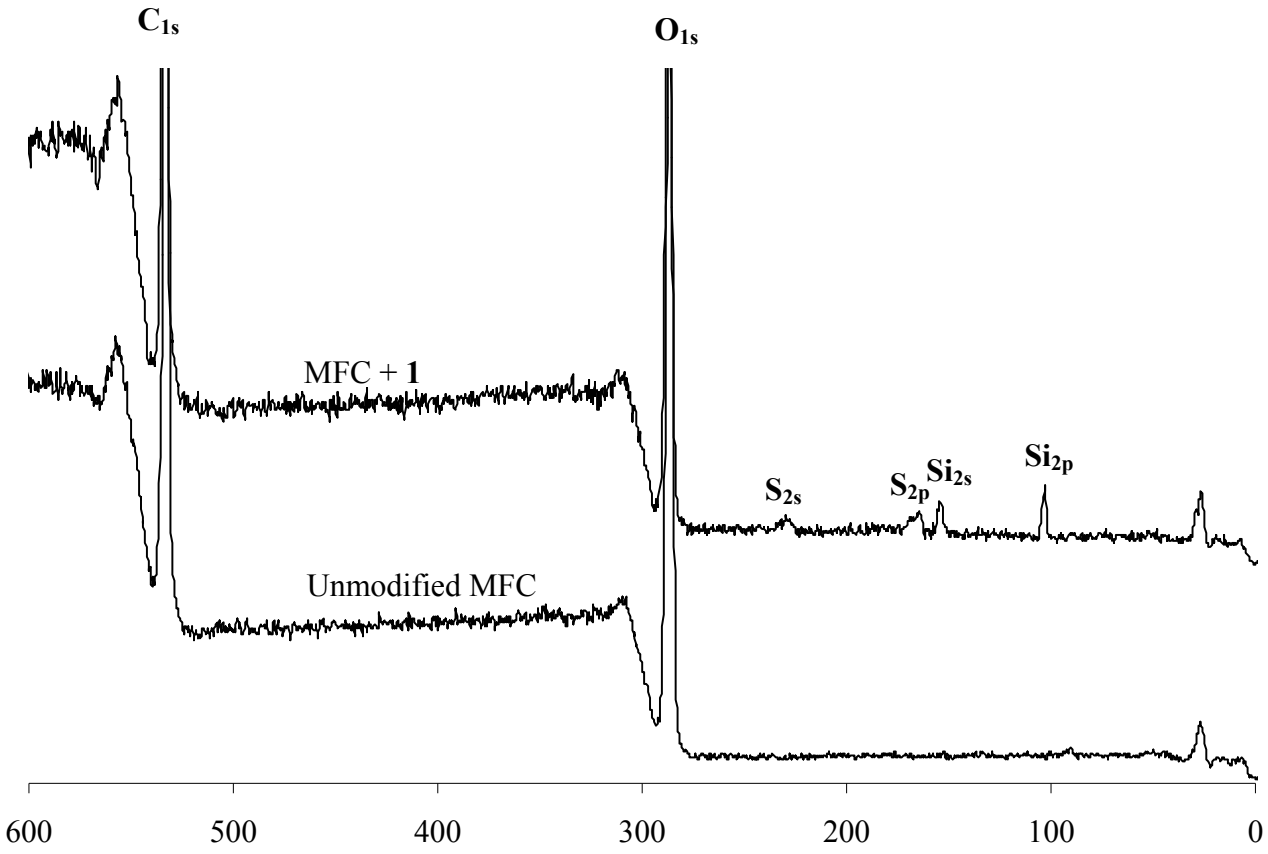

Figure S6. XPS low-resolution survey spectra of unmodified MFC and MFC modified with **1**.

1. Al-Hashimi, M.; Sullivan, A. C.; Wilson, J. R. H., Palladium ethylthioglycolate modified silica - a new heterogeneous catalyst for Suzuki and Heck cross-coupling reactions. *J. Mol. Catal. A-Chem.* **2007,** 273, (1-2), 298-302.