Supporting Information for

Conversion of Cellulose to High Yield Glucose in Water over Sulfonated Mesoporous Carbon Fibers with Optimized Acidity

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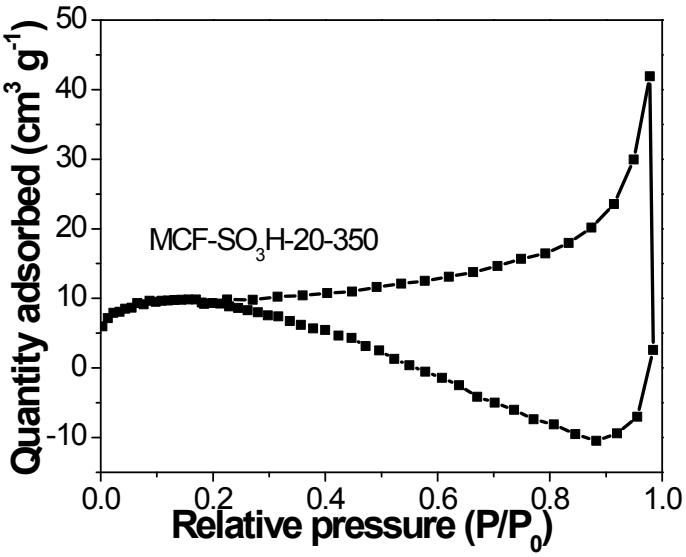
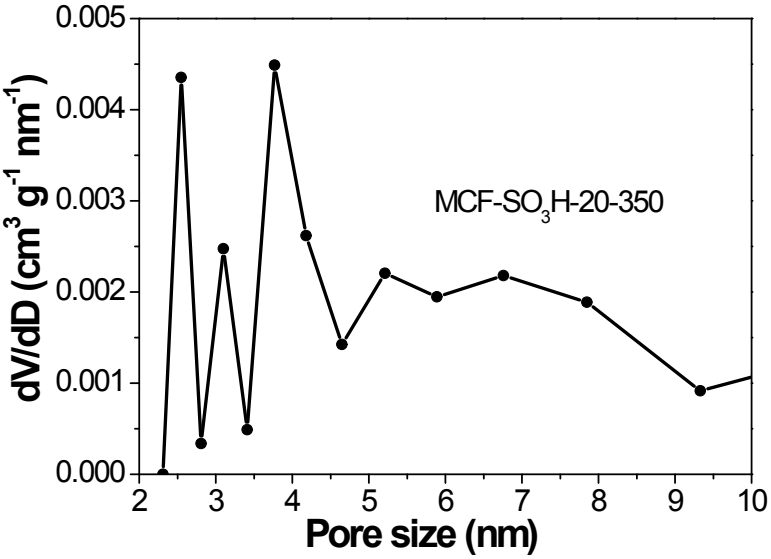
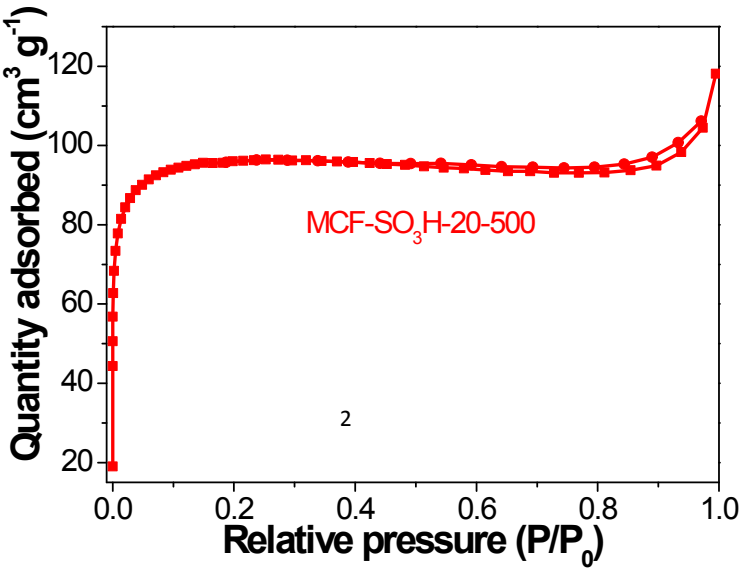
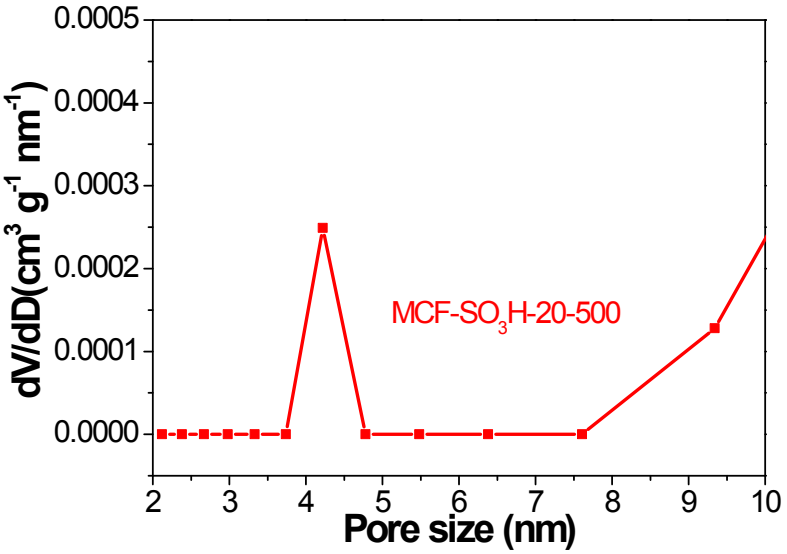
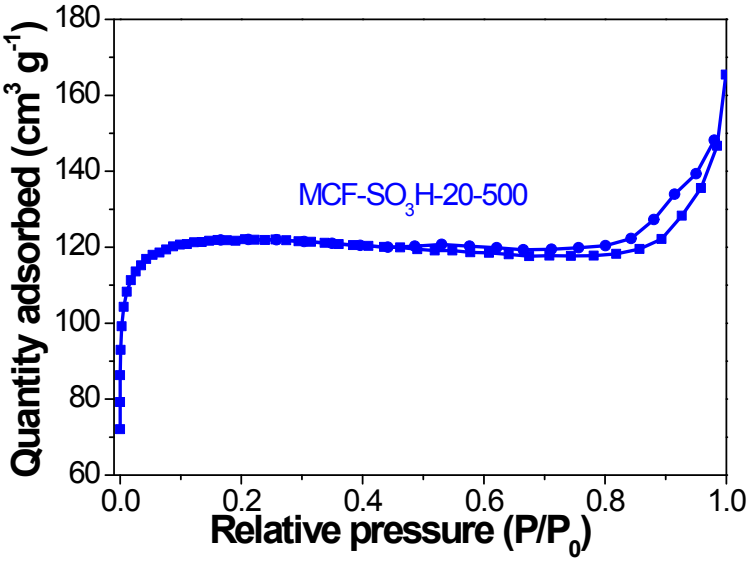
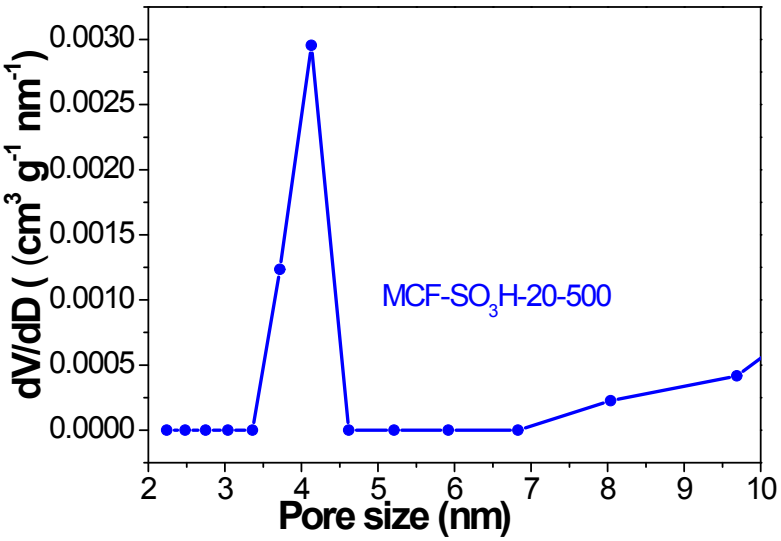

Quantity adsorbed (cm^3 g^{-1})
Relative pressure (P/P$_0$)
MCF-SO$_3$H-20-350
50
40
30
20
10
0
-10
0.0
0.2
0.4
0.6
0.8
1.0

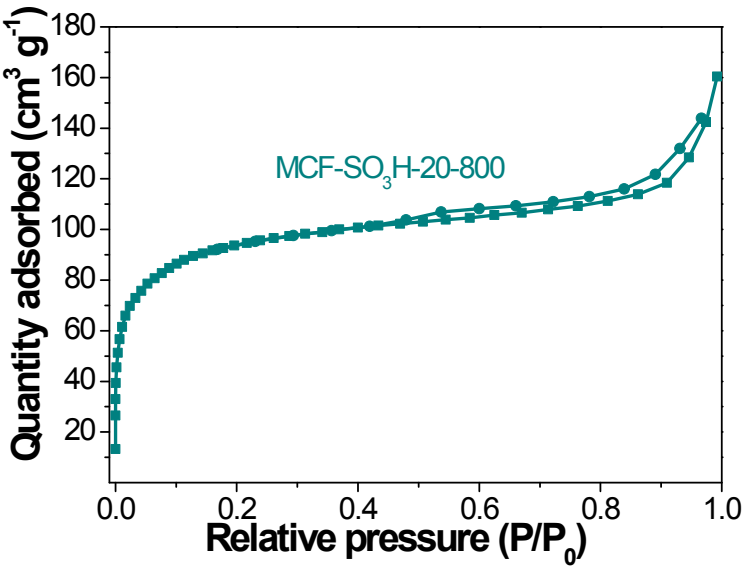

dV/dD (cm^3 g^{-1} nm^{-1})
Pore size (nm)
MCF-SO$_3$H-20-350
0.005
0.004
0.003
0.002
0.001
0.000
2
3
4
5
6
7
8
9
10

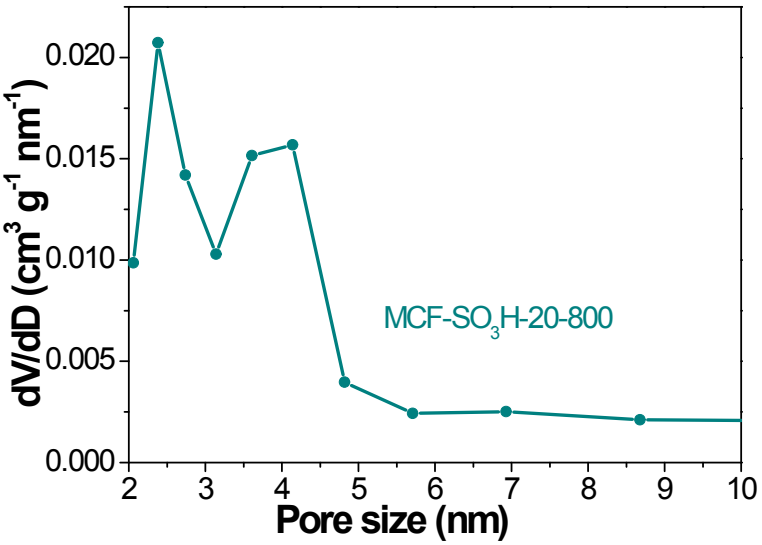

Quantity adsorbed (cm^3 g^{-1})
Relative pressure (P/P$_0$)
MCF-SO$_3$H-20-500
120
100
80
60
40
20
0.0
0.2
0.4
0.6
0.8
1.0

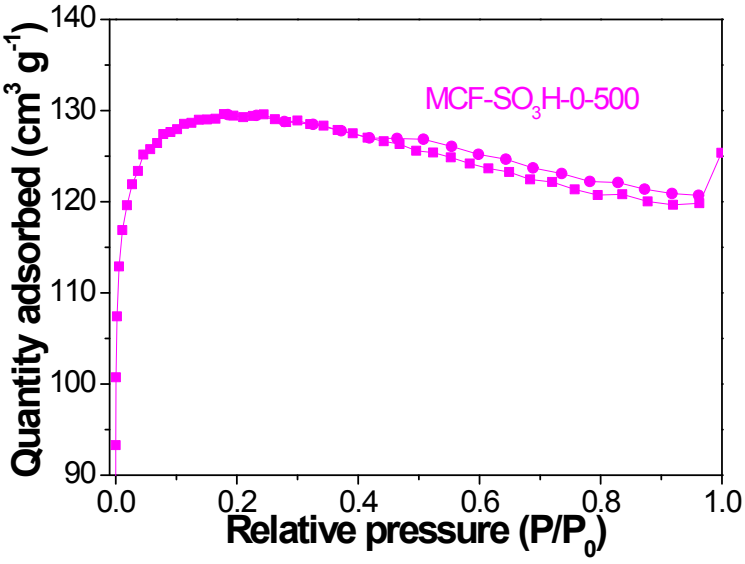

0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
dV/dD(cm3 g-1 nm-1)
MCF-SO3H-20-500
2
3
4
5
6
7
8
9
10
Pore size (nm)

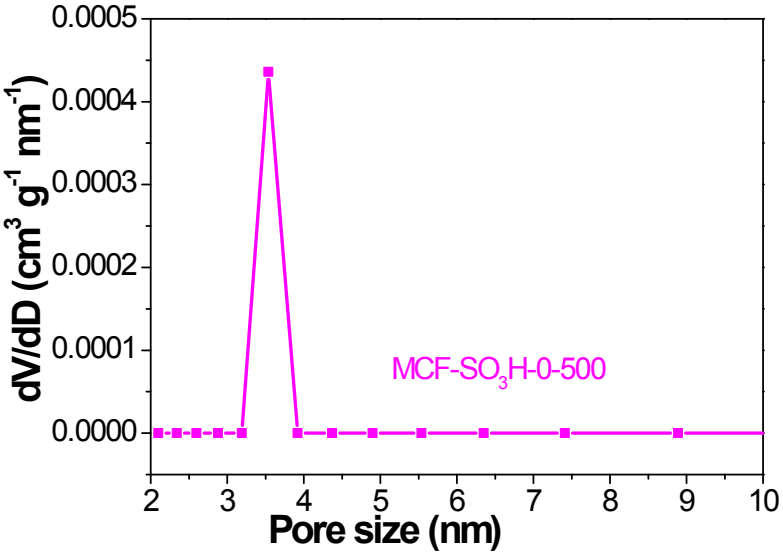

180
160
140
120
100
80
60
Quantity adsorbed (cm3 g-1)
MCF-SO3H-20-500
0.0
0.2
0.4
0.6
0.8
1.0
Relative pressure (P/P0)

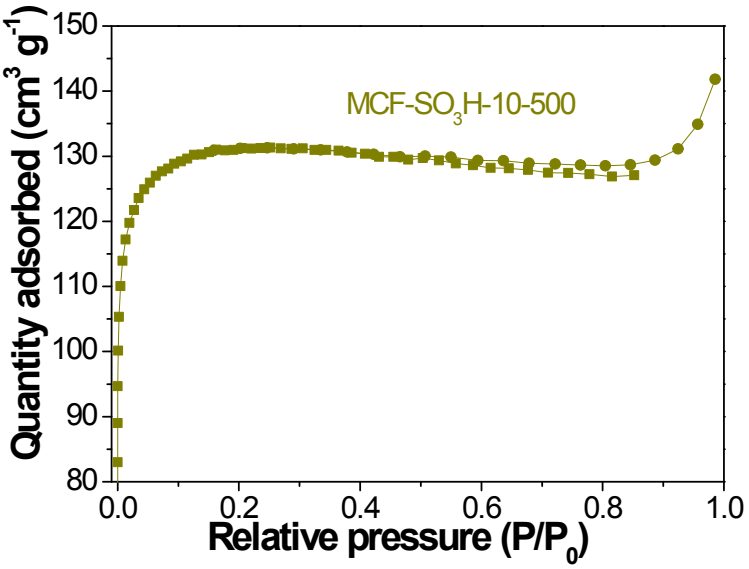

dV/dD ((cm3 g-1 nm-1)
0.0030
0.0025
0.0020
0.0015
0.0010
0.0005
0.0000
MCF-SO3H-20-500
2
3
4
5
6
7
8
9
10
Pore size (nm)

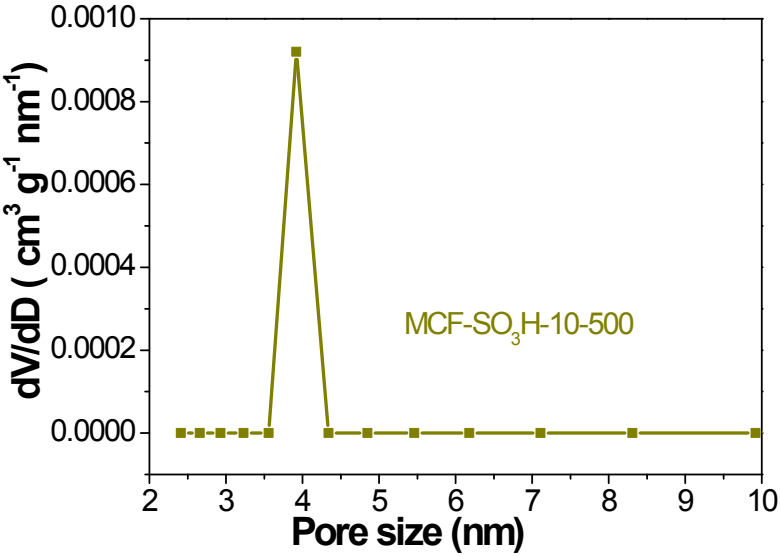

Quantity adsorbed (cm3 g-1)
180
160
140
120
100
80
60
40
20
MCF-SO3H-20-800
0.0
0.2
0.4
0.6
0.8
1.0
Relative pressure (P/P0)

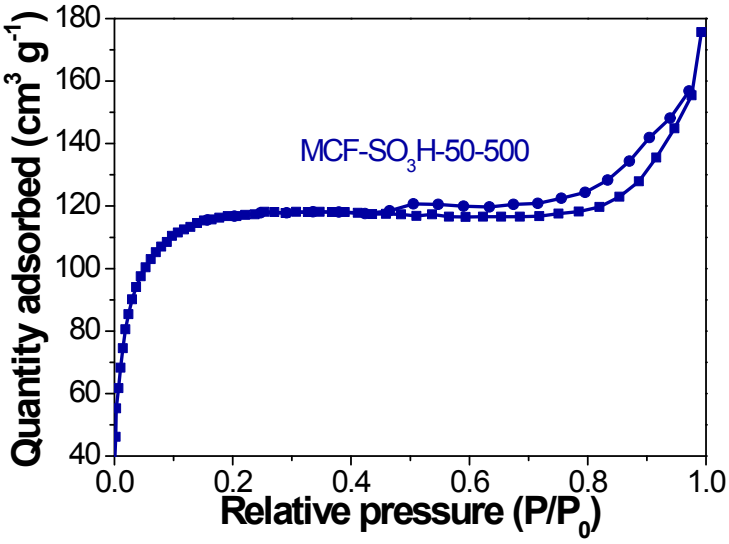

dV/dD (cm3 g-1 nm-1)
0.020
0.015
0.010
0.005
0.000
2
3
4
5
6
7
8
9
10
Pore size (nm)
MCF-SO3H-20-800


Quantity adsorbed (cm3 g-1)
140
130
120
110
100
90
0.0
0.2
0.4
0.6
0.8
1.0
Relative pressure (P/P0)
MCF-SO3H-0-500


0.0005
0.0004
0.0003
0.0002
0.0001
0.0000
dV/dD (cm3 g-1 nm-1)
MCF-SO3H-0-500
2
3
4
5
6
7
8
9
10
Pore size (nm)


150
140
130
120
110
100
90
80
Quantity adsorbed (cm3 g-1)
MCF-SO3H-10-500
0.0
0.2
0.4
0.6
0.8
1.0
Relative pressure (P/P0)


0.0010
0.0008
0.0006
0.0004
0.0002
0.0000
dV/dD (cm3 g-1 nm-1)
MCF-SO3H-10-500
2
3
4
5
6
7
8
9
10
Pore size (nm)


180
160
140
120
100
80
60
40
Quantity adsorbed (cm3 g-1)
MCF-SO3H-50-500
0.0
0.2
0.4
0.6
0.8
1.0
Relative pressure (P/P0)

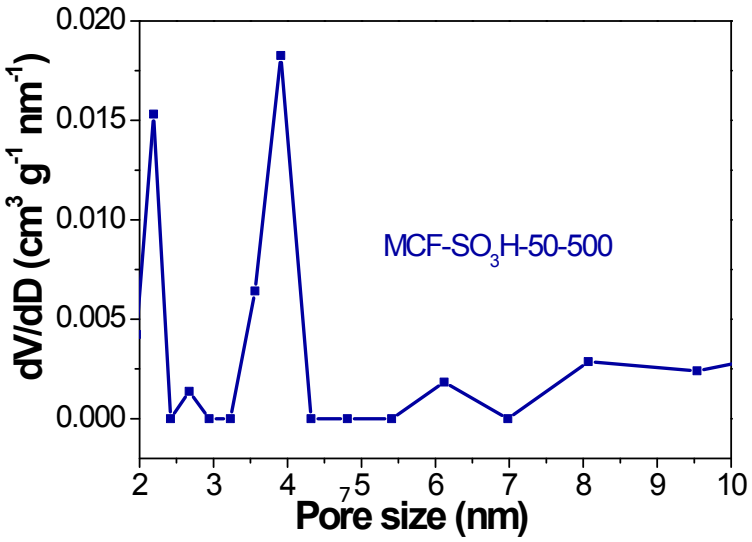
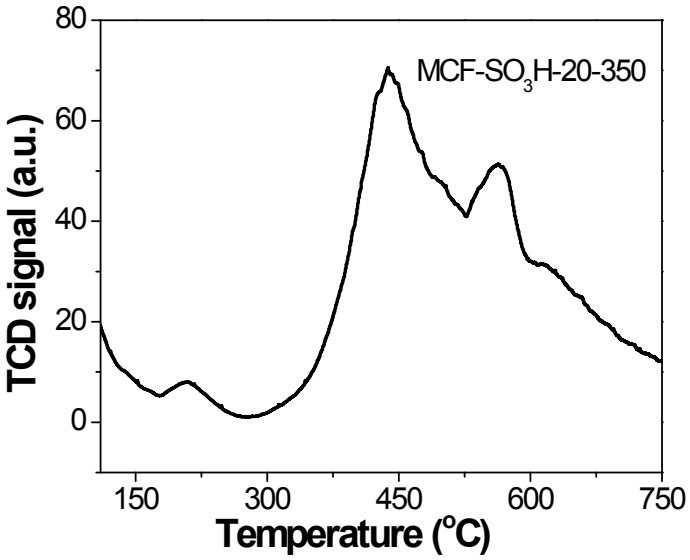
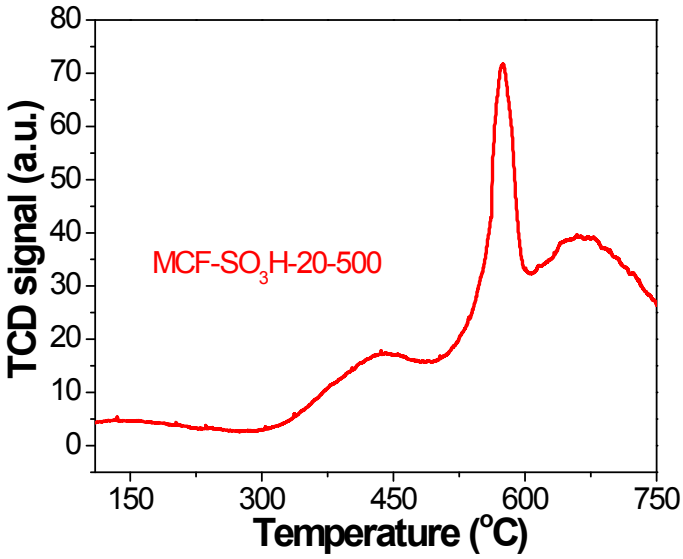
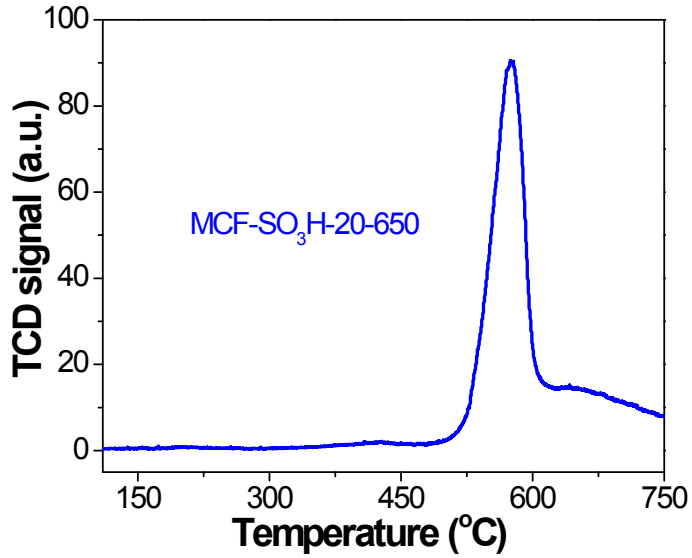
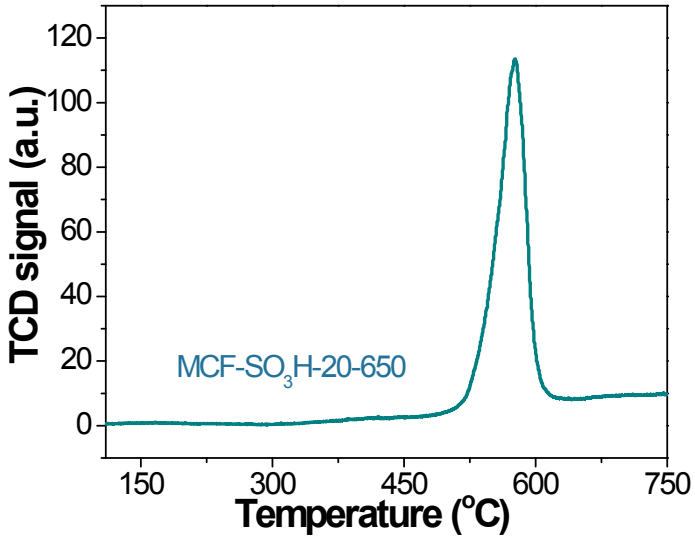

0.020
0.015
0.010
0.005
0.000
dV/dD (cm3 g-1 nm-1)
MCF-SO3H-50-500
2
3
4
5
6
7
8
9
10
Pore size (nm)

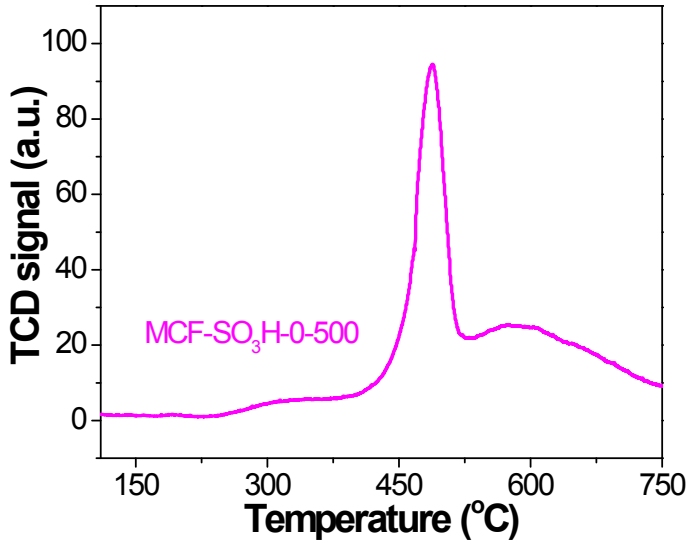
Fig. S1. Separated N_2 adsorption/desorption isotherms and the corresponding pore size distribution curves for different MCF-SO_3H-x-t catalysts.

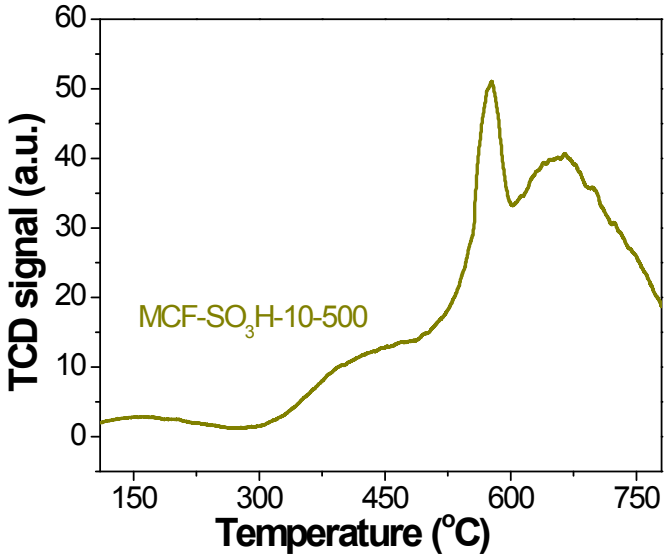





TCD signal (a.u.)
Temperature (°C)
MCF-SO3H-20-650
0
20
40
60
80
100
150
300
450
600
750


TCD signal (a.u.)
Temperature (°C)
MCF-SO3H-20-650
0
20
40
60
80
100
120
150
300
450
600
750


TCD signal (a.u.)
100
80
60
40
20
0
MCF-SO3H-0-500
150
300
450
600
750
Temperature (°C)


TCD signal (a.u.)
60
50
40
30
20
10
0
MCF-SO3H-10-500
150
300
450
600
750
Temperature (°C)

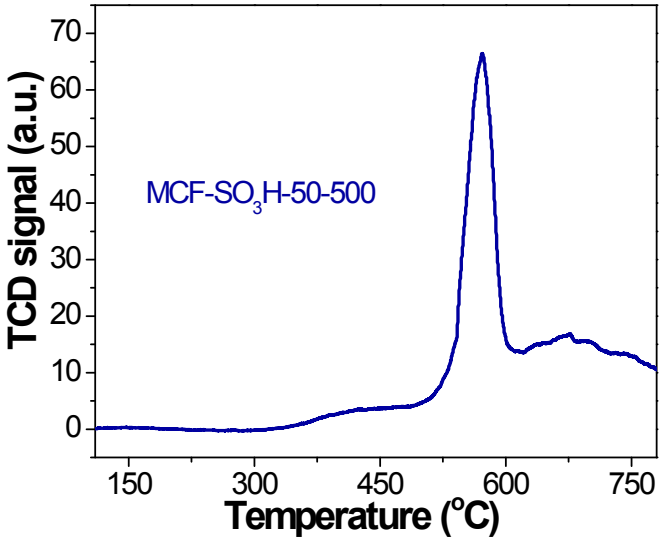
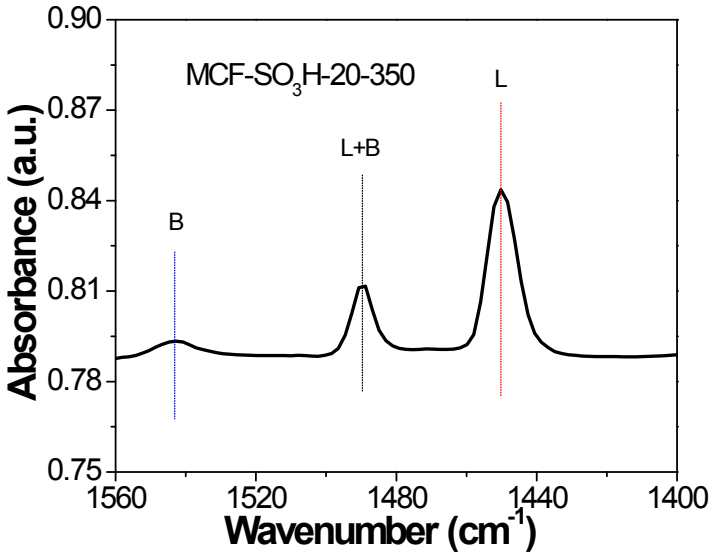
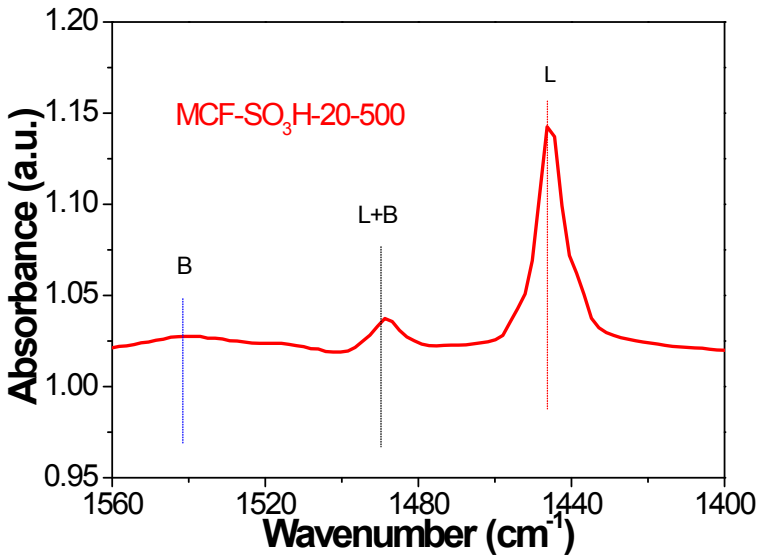
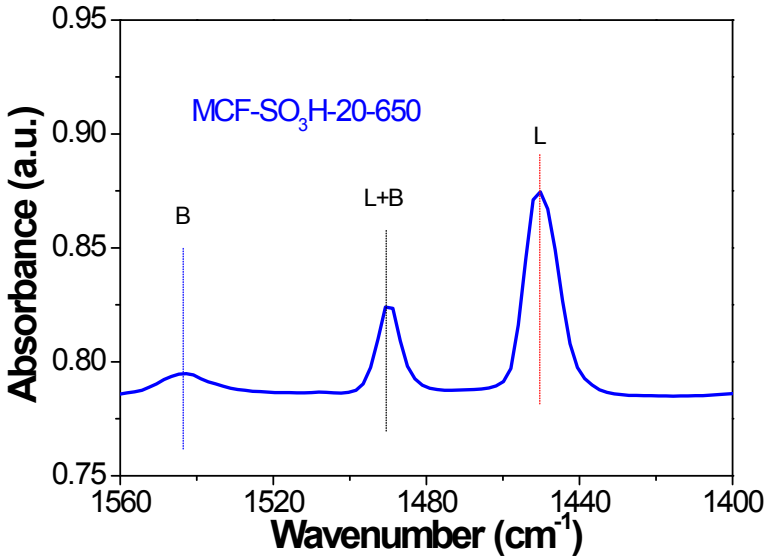
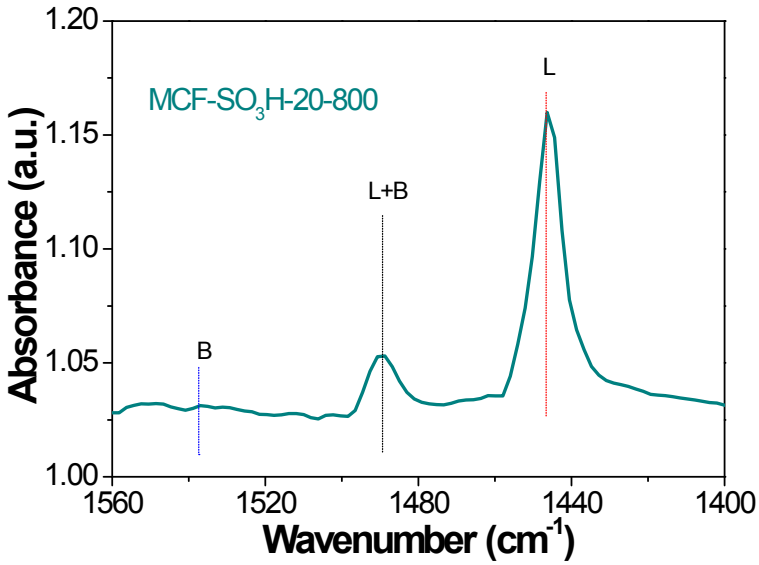


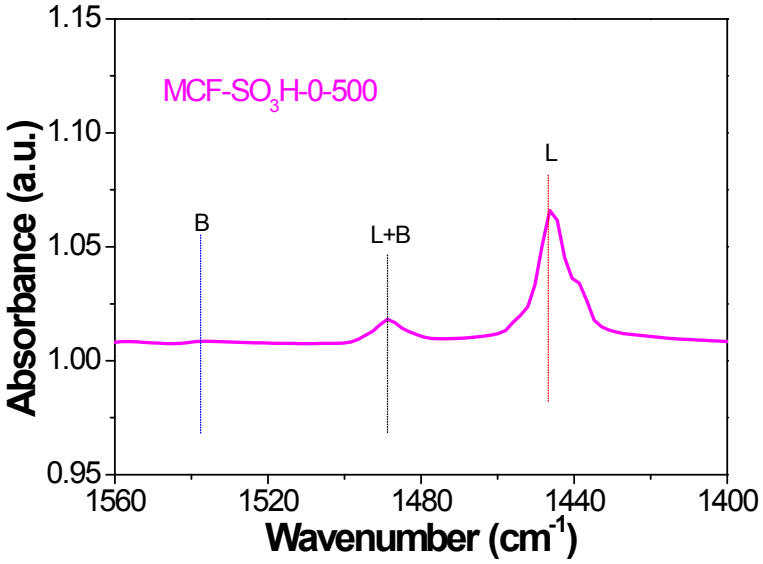
Fig. S2. Separated NH_3-TPD curves for MCF-SO_3H-x-t catalysts.

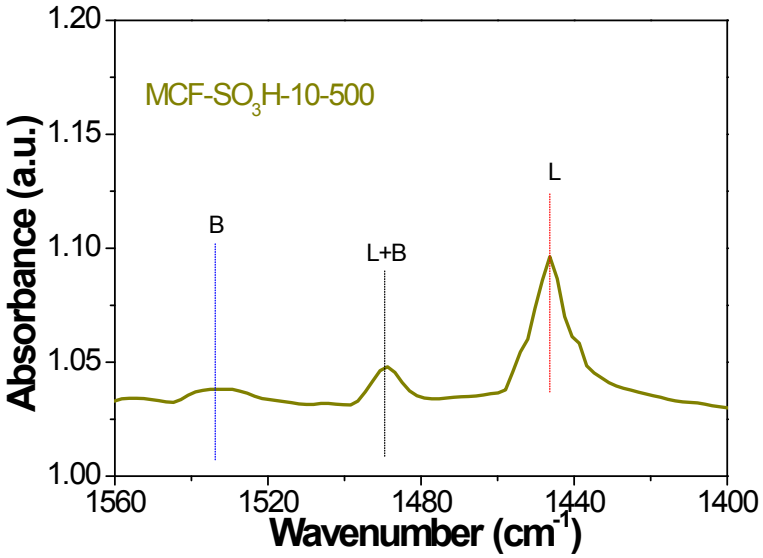

MCF-SO3H-20-350
L
L+B
B
Absorbance (a.u.)
0.90
0.87
0.84
0.81
0.78
0.75
1560
1520
1480
1440
1400
Wavenumber (cm-1)


MCF-SO3H-20-500
L
L+B
B
Absorbance (a.u.)
1.20
1.15
1.10
1.05
1.00
0.95
1560
1520
1480
1440
1400
Wavenumber (cm-1)


MCF-SO3H-20-650
B
L+B
L
Absorbance (a.u.)
Wavenumber (cm-1)
0.95
0.90
0.85
0.80
0.75
1560
1520
1480
1440
1400


MCF-SO3H-20-800
B
L+B
L
Absorbance (a.u.)
Wavenumber (cm-1)
1.20
1.15
1.10
1.05
1.00
1560
1520
1480
1440
1400


MCF-SO3H-0-500
B
L+B
L
Absorbance (a.u.)
Wavenumber (cm-1)
1.15
1.10
1.05
1.00
0.95
1560
1520
1480
1440
1400


MCF-SO3H-10-500
B
L+B
L
Absorbance (a.u.)
Wavenumber (cm-1)
1.20
1.15
1.10
1.05
1.00
1560
1520
1480
1440
1400

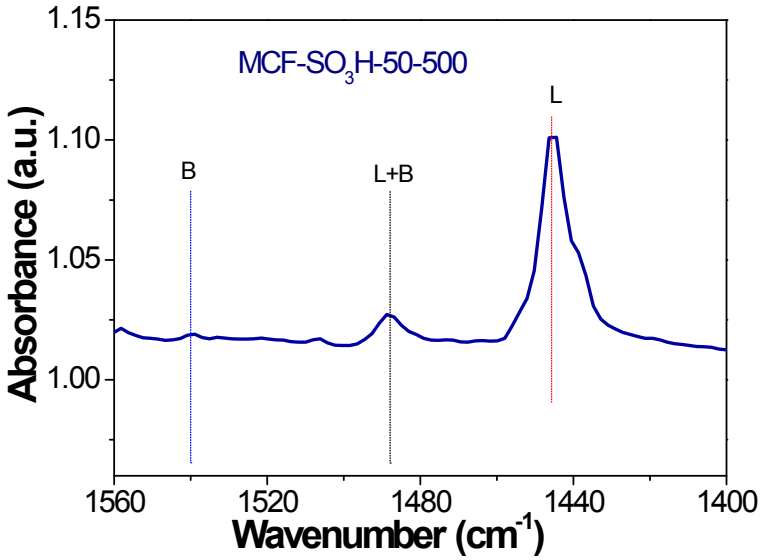


Fig. S3. Separated Py-IR spectra for MCF-SO_3H-x-t catalysts.

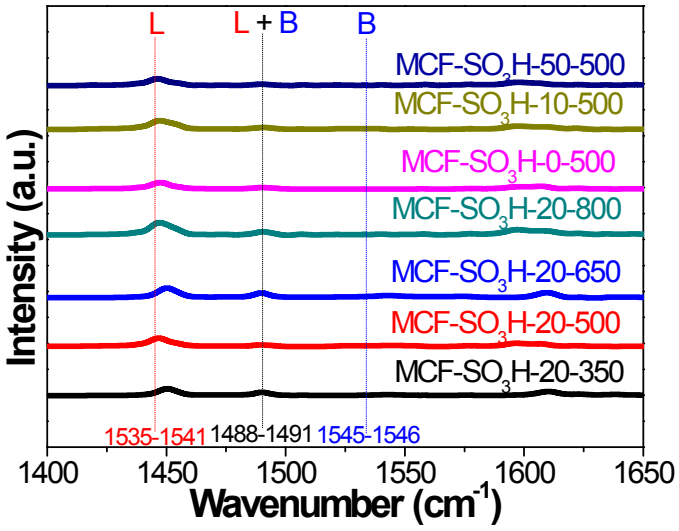


Fig. S4. Py-IR spectra for different MCF-SO_3H-x-t catalysts at 300 °C.

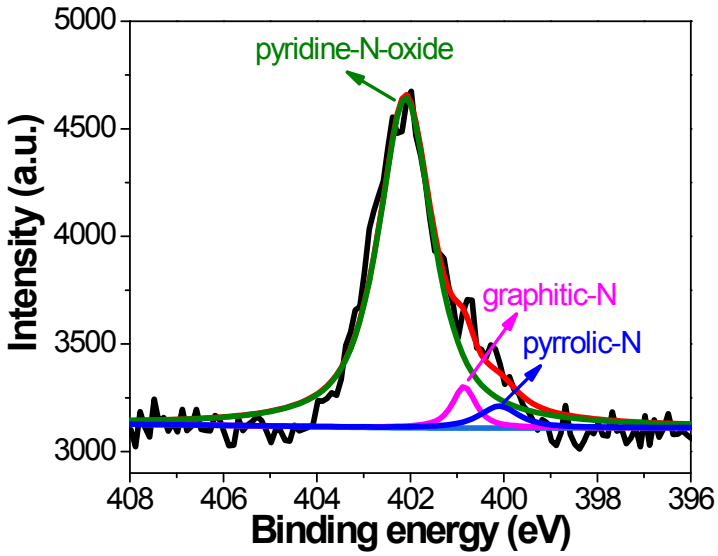
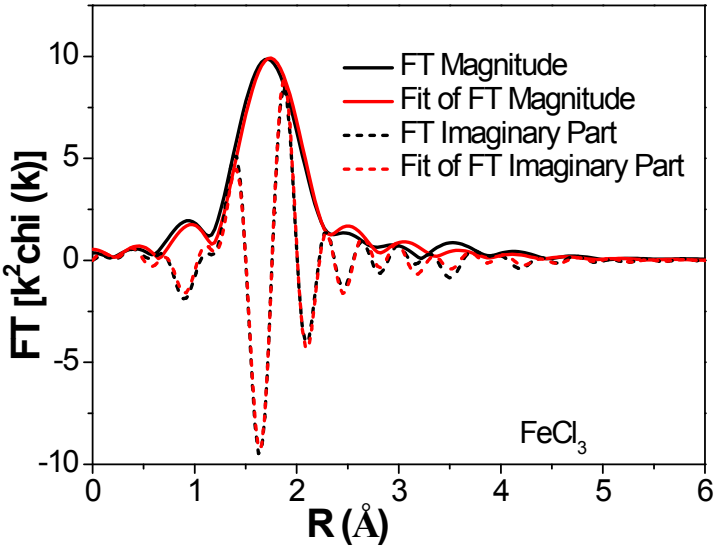
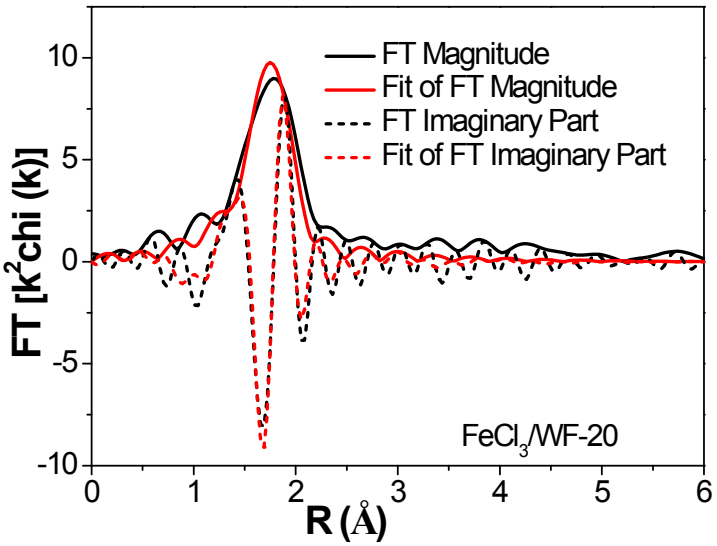
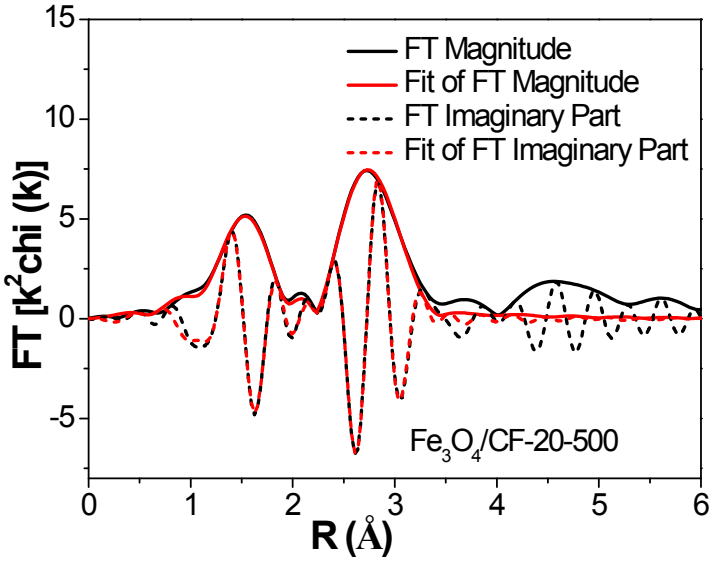
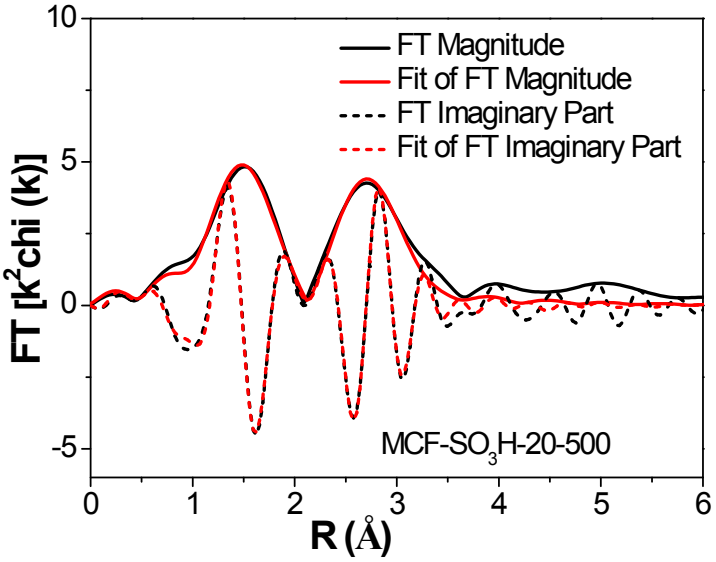


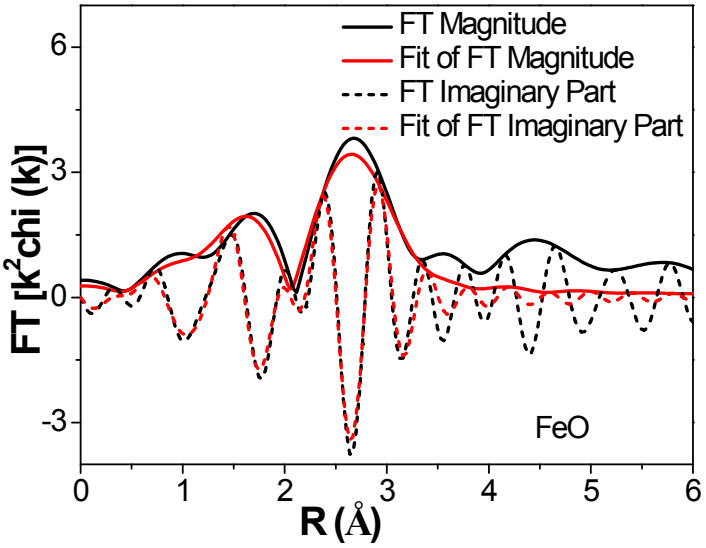
Fig. S5. N 1s XPS spectrum for MCF-SO_3H-20-500.

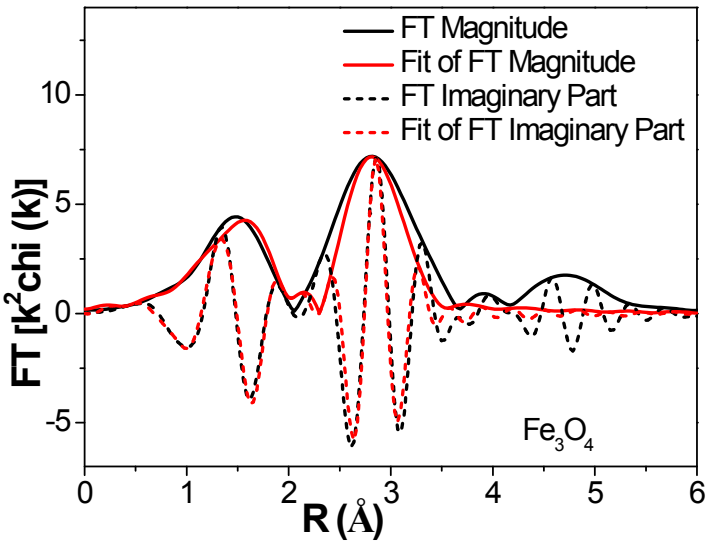

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
FeCl3
FT [k2chi (k)]
R (Å)
10
5
0
-5
-10
0
1
2
3
4
5
6

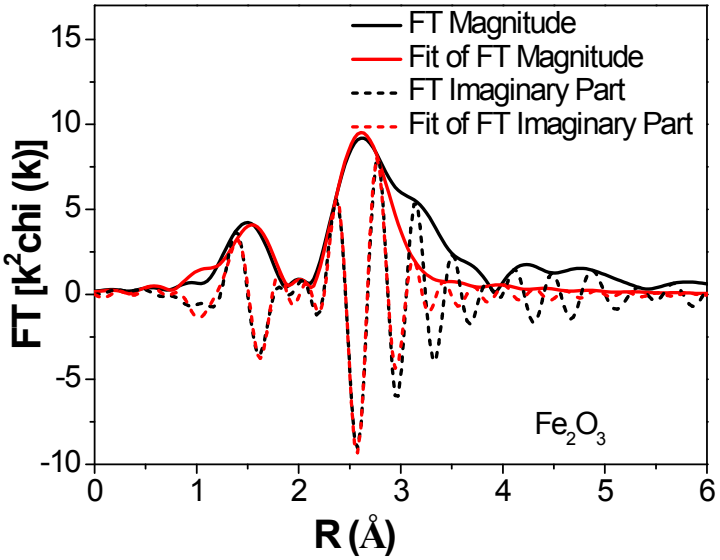

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
FeCl3/WF-20
FT [k2chi (k)]
R (Å)
10
5
0
-5
-10
0
1
2
3
4
5
6

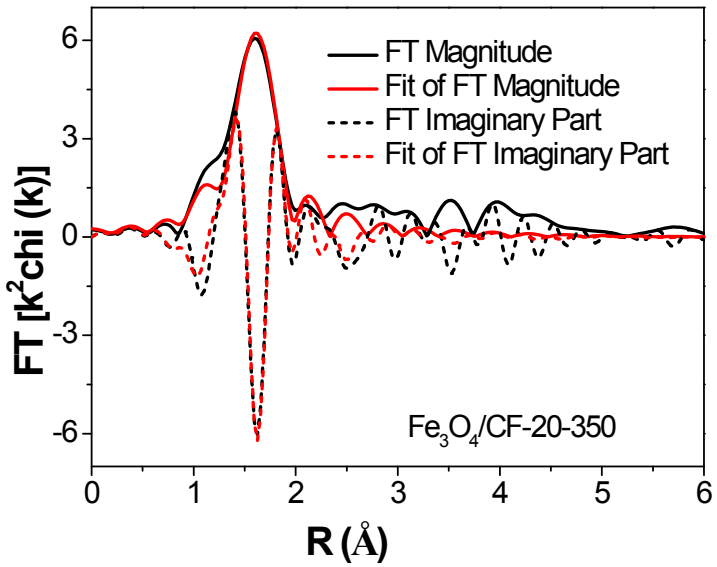

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4/CF-20-500
FT [k2chi (k)]
R (Å)

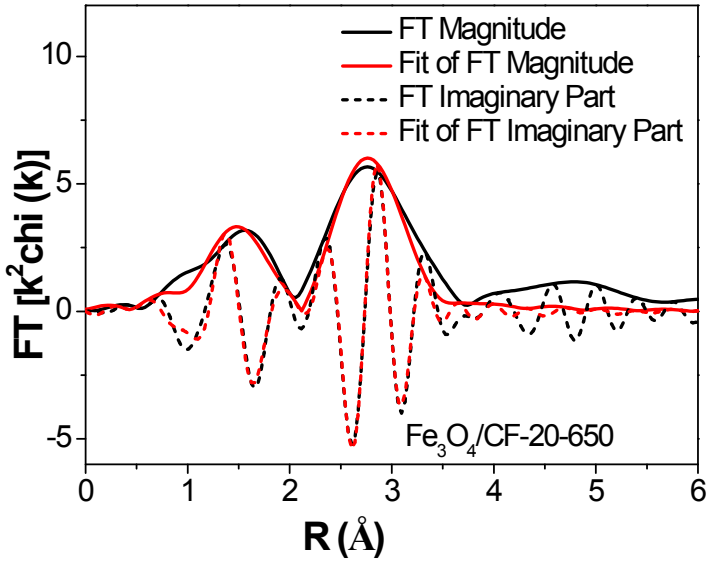

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
MCF-SO3H-20-500
FT [k2chi (k)]
R (Å)

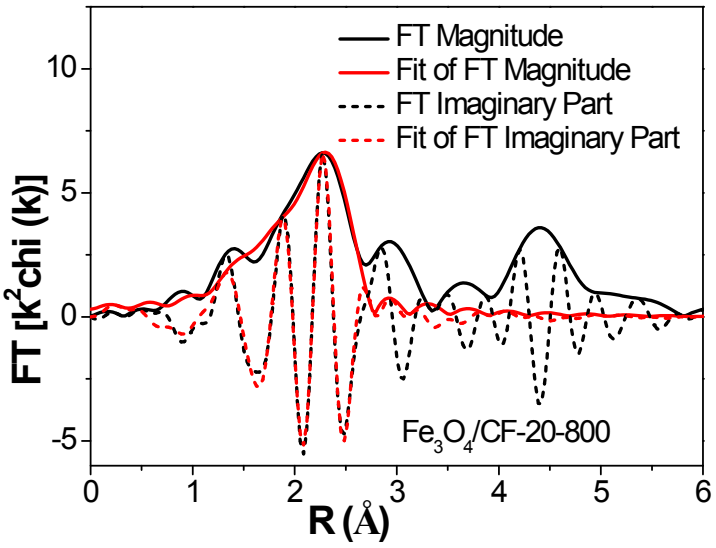

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
FeO
FT [k²chi (k)]
R (Å)
6
3
0
-3
0
1
2
3
4
5
6

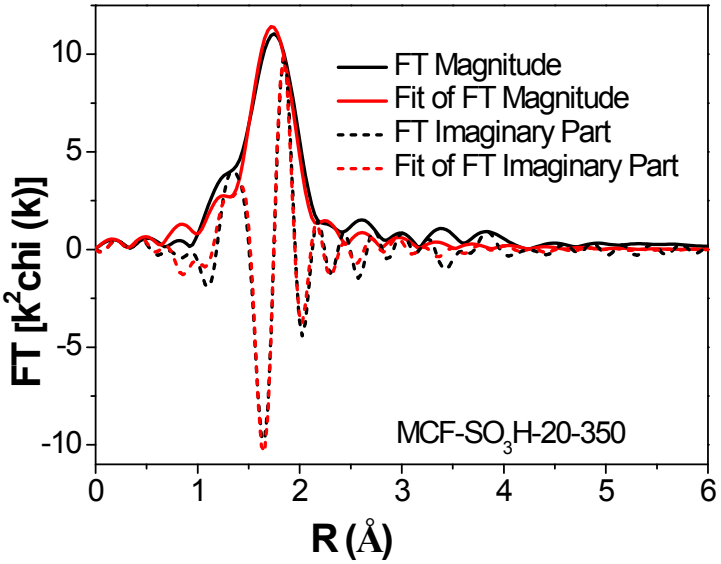

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4
FT [k²chi (k)]
R (Å)
10
5
0
-5
0
1
2
3
4
5
6

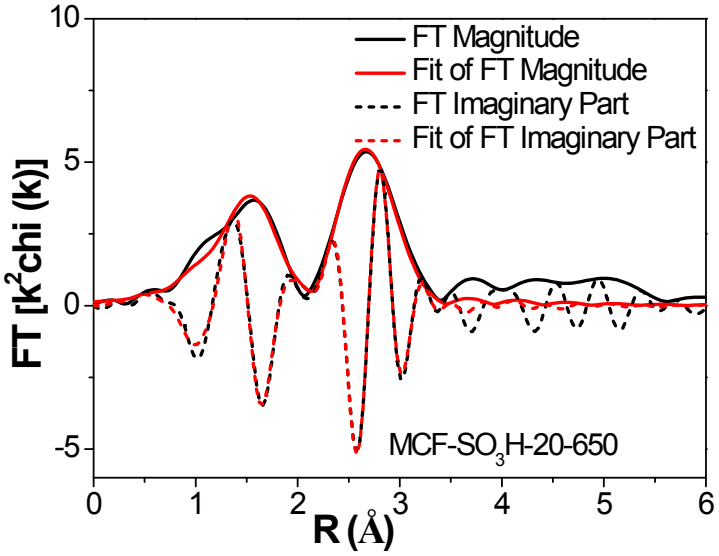

FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe2O3
FT [k2chi (k)]
R (Å)


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4/CF-20-350
FT [k2chi (k)]
R (Å)


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4/CF-20-650
FT [k2chi (k)]
R (Å)
10
5
0
-5
0
1
2
3
4
5
6


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4/CF-20-800
FT [k2chi (k)]
R (Å)
10
5
0
-5
0
1
2
3
4
5
6


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
MCF-SO3H-20-350
FT [k2chi (k)]
R (Å)
10
5
0
-5
-10
0
1
2
3
4
5
6


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
MCF-SO3H-20-650
FT [k2chi (k)]
R (Å)
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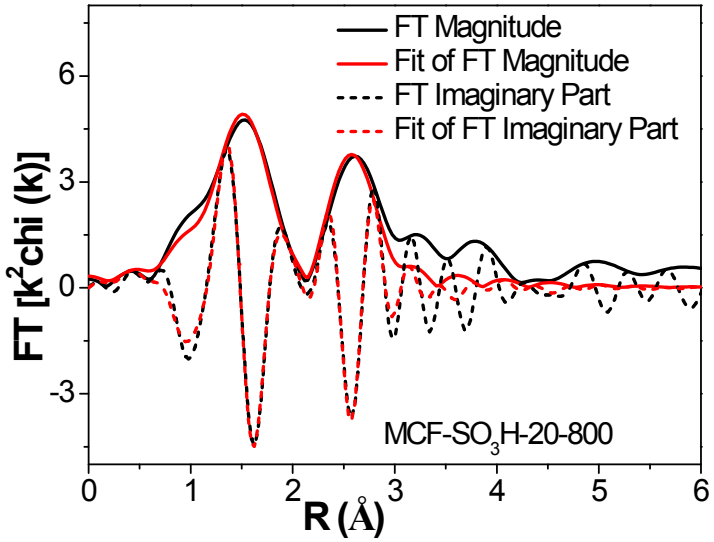
0
-5
0
1
2
3
4
5
6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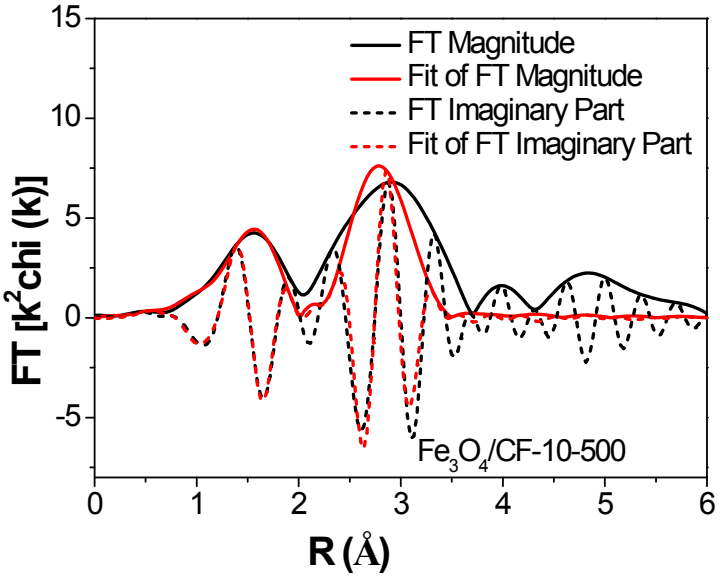
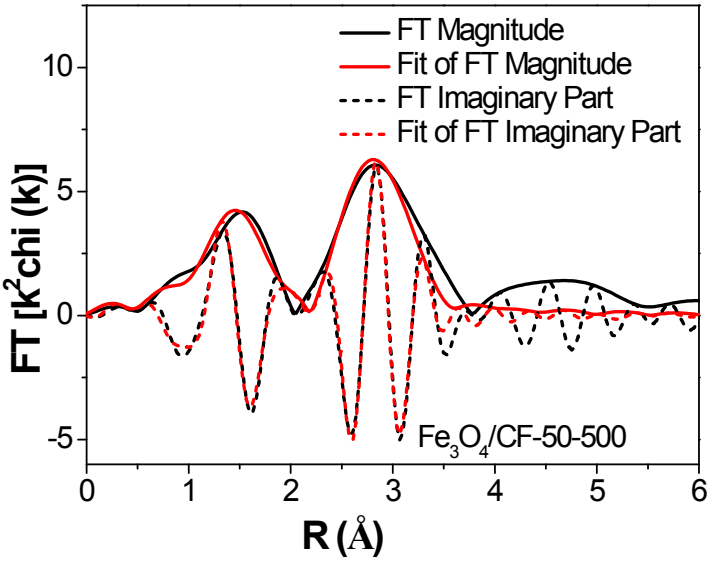
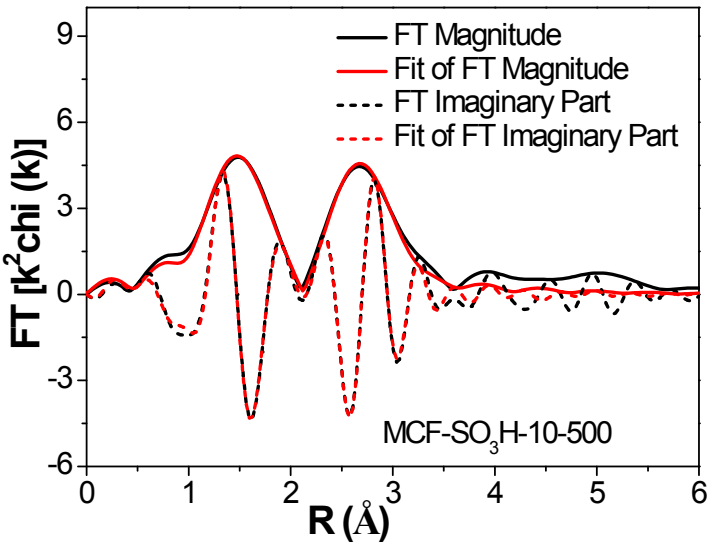
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
MCF-SO3H-20-800
FT [k2chi (k)]
R (Å)


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4/CF-10-500
FT [k2chi (k)]
R (Å)


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
Fe3O4/CF-50-500
FT [k2chi (k)]
R (Å)


FT Magnitude
Fit of FT Magnitude
FT Imaginary Part
Fit of FT Imaginary Part
MCF-SO3H-10-500
FT [k2chi (k)]
R (Å)

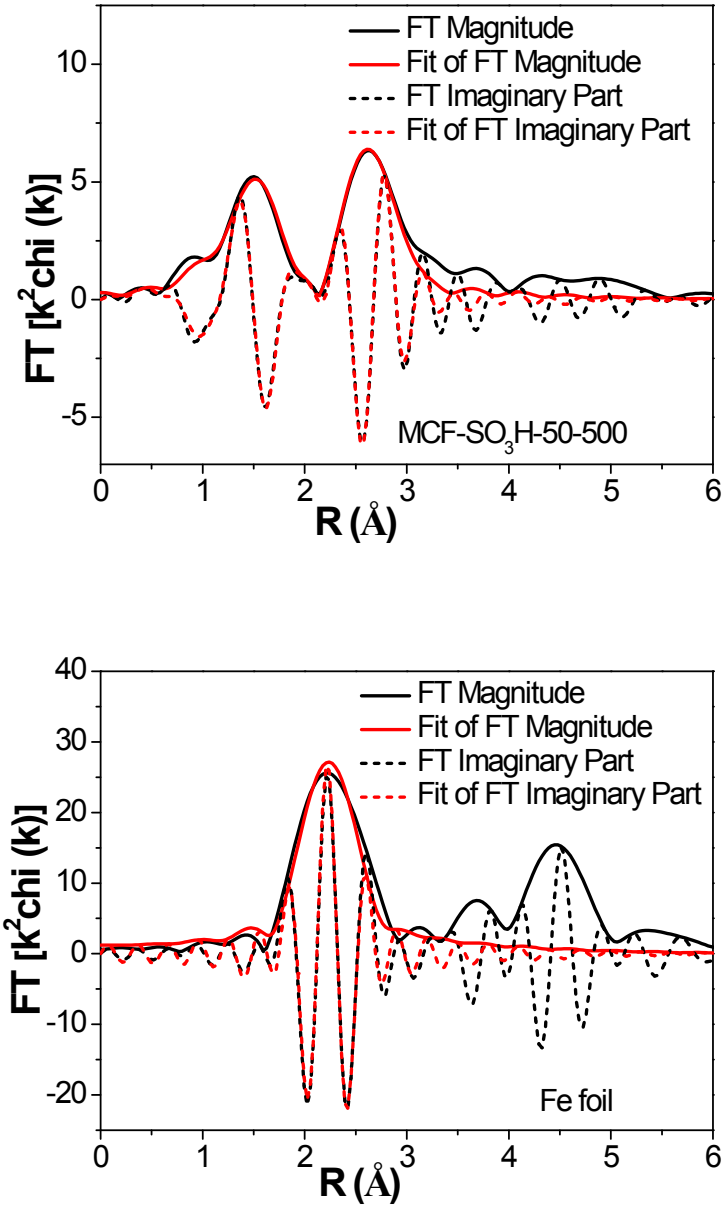


Fig. S6. Fourier transformed k^2-weighted EXAFS oscillations measured at Fe K-edge for various Fe-containing samples.

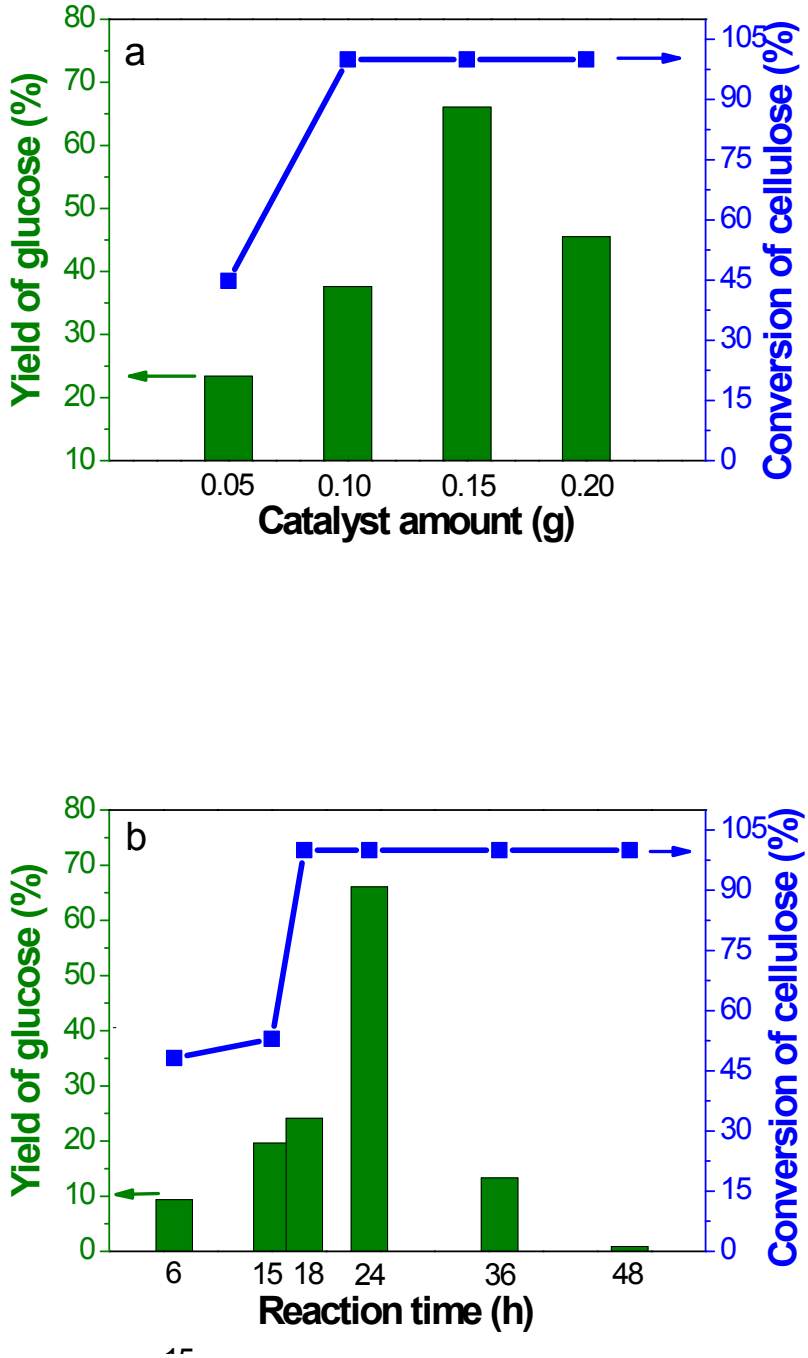


Fig. S7. Glulose yields in the conversion of cellulose using MCF-SO_3H-20-500 (a) at a different catalyst amount and (b) at a different duration.

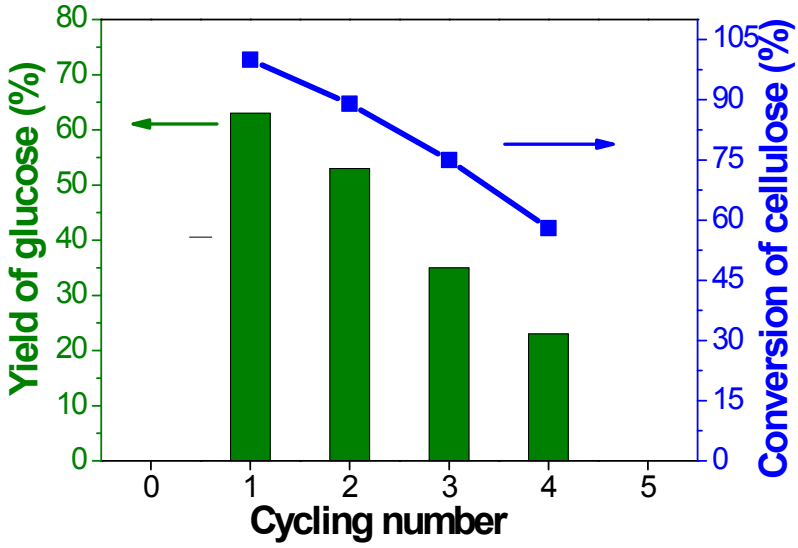


Fig. S8. Cycling stablity of MCF-SO_3H-20-500 towards cellulose hydrolysis. Reaction conditions: 0.15 g catalyst, 0.05 g cellulose, 10 mL water, 150 ^oC and 24 h.