

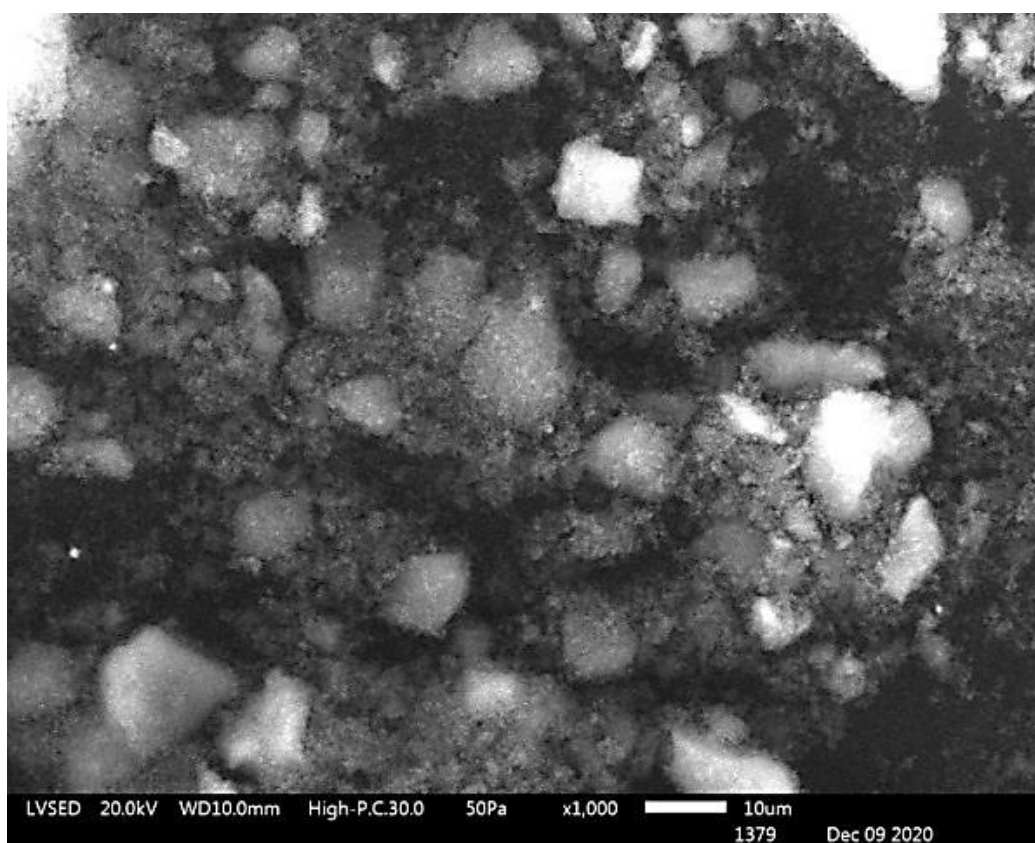
## Supporting Information

### Epoxidation of fatty acid methyl esters with hydrogen peroxide catalyzed by peroxopolyoxotungstate PW4 encapsulated in the MIL-100(Cr) framework

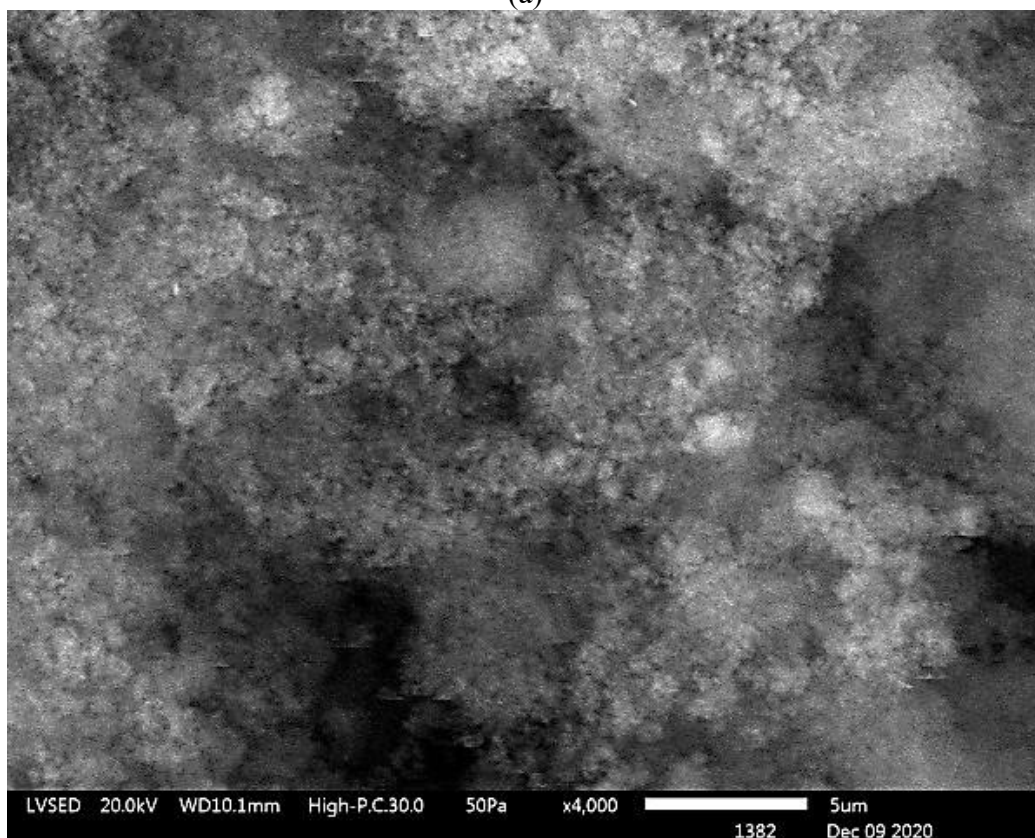
Anton L. Esipovich, Evgeny A. Kanakov, Tatyana A. Charykova and Ksenia V. Otopkova

#### Supplementary Materials Content:

Figure S1. SEM images of MIL-100(Cr).....	S2
Figure S2. SEM images of PW12@MIL-100(Cr).....	S3
Figure S3. SEM images of PW4@MIL-100(Cr).....	S4
Figure S4. EDS analysis of PW12@MIL-100(Cr).....	S5
Figure S5. EDS analysis of PW4@MIL-100(Cr).....	S5
Figure S6. N <sub>2</sub> adsorption isotherms of MIL-100(Cr).....	S6
Figure S7. N <sub>2</sub> adsorption isotherms of PW12@MIL-100(Cr).....	S6
Figure S8. N <sub>2</sub> adsorption isotherms of PW4@MIL-100(Cr).....	S7
Figure S9. N <sub>2</sub> adsorption isotherms of PW4@MIL-100(Cr) after 1 cycles.....	S7
Figure S10. N <sub>2</sub> adsorption isotherms of PW4@MIL-100(Cr) after 5 cycles.....	S8
Figure S11. Mass spectrum of FAME oxidation products.....	S9
Figure S12. Mass spectrum of FAME Oligomerization products.....	S10
Figure S13. Mass spectrum of methyl stearate oxidation products.....	S11
Figure S14. SEM images of PW4@MIL-100(Cr) fresh and after 1 catalytic cycle.....	S12
Figure S15. XRD patterns of PW4@MIL-100(Cr) .....	S13
Figure S16. FTIR spectra of PW4@MIL-100(Cr).....	S13

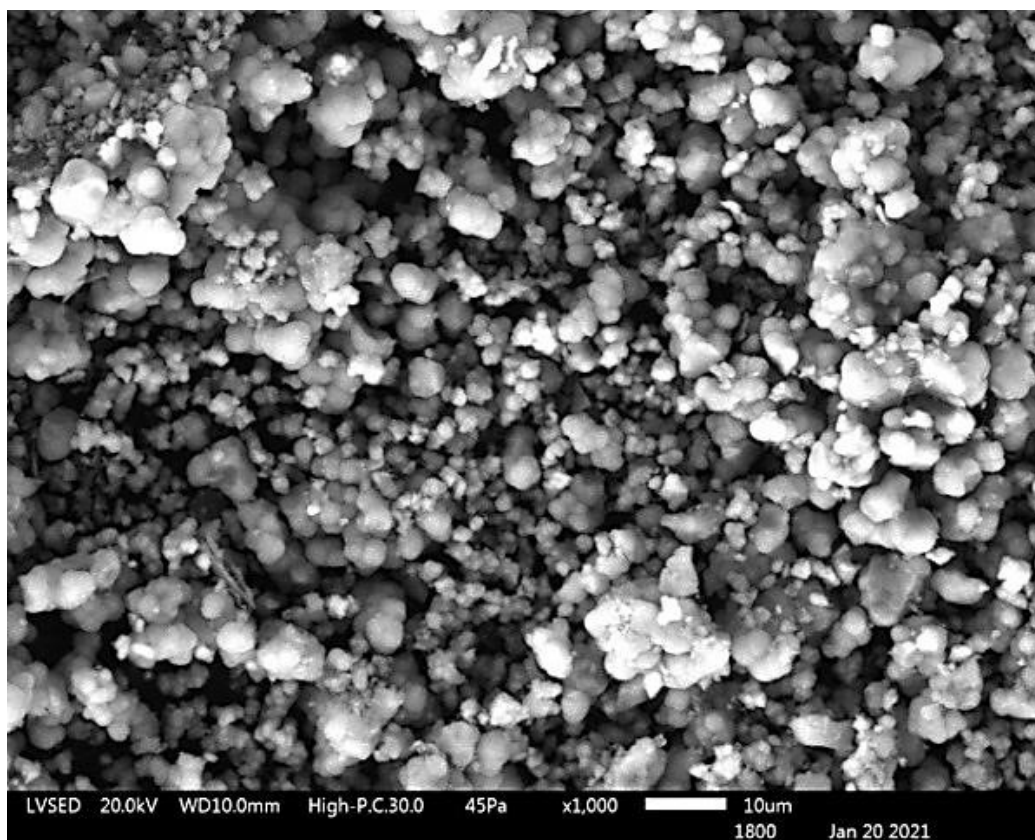


(a)

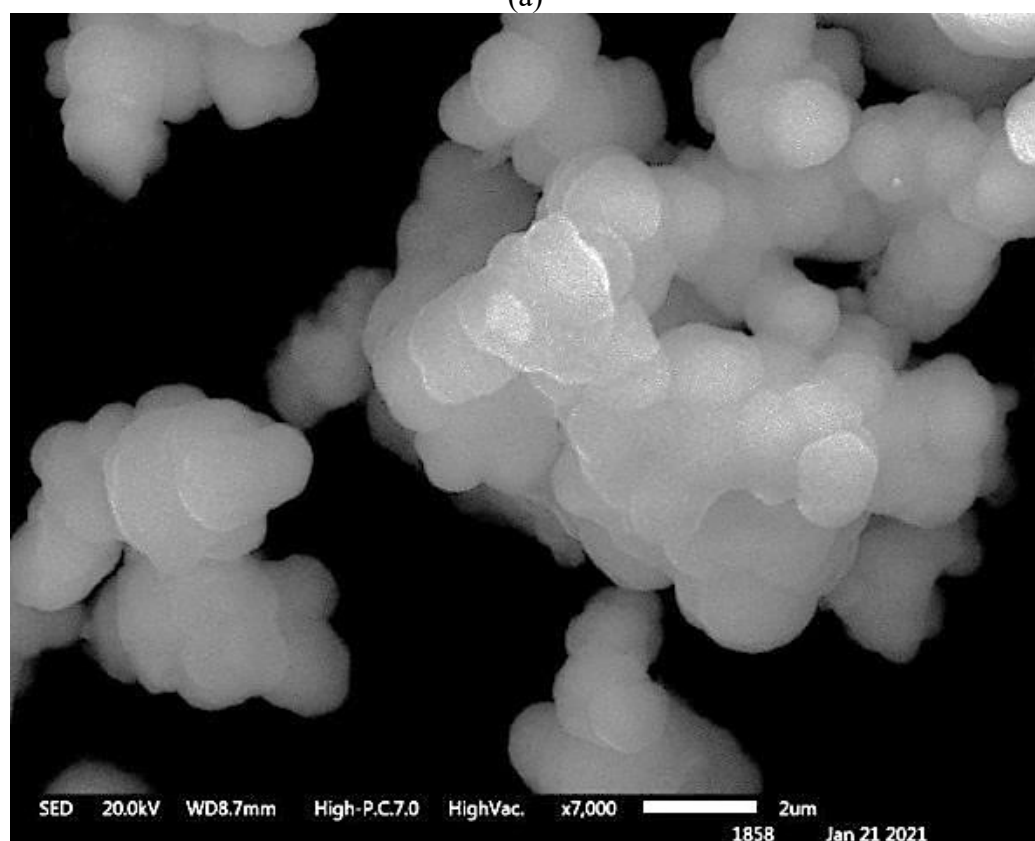


(b)

**Figure S1.** SEM images of (a, b) MIL-100(Cr).

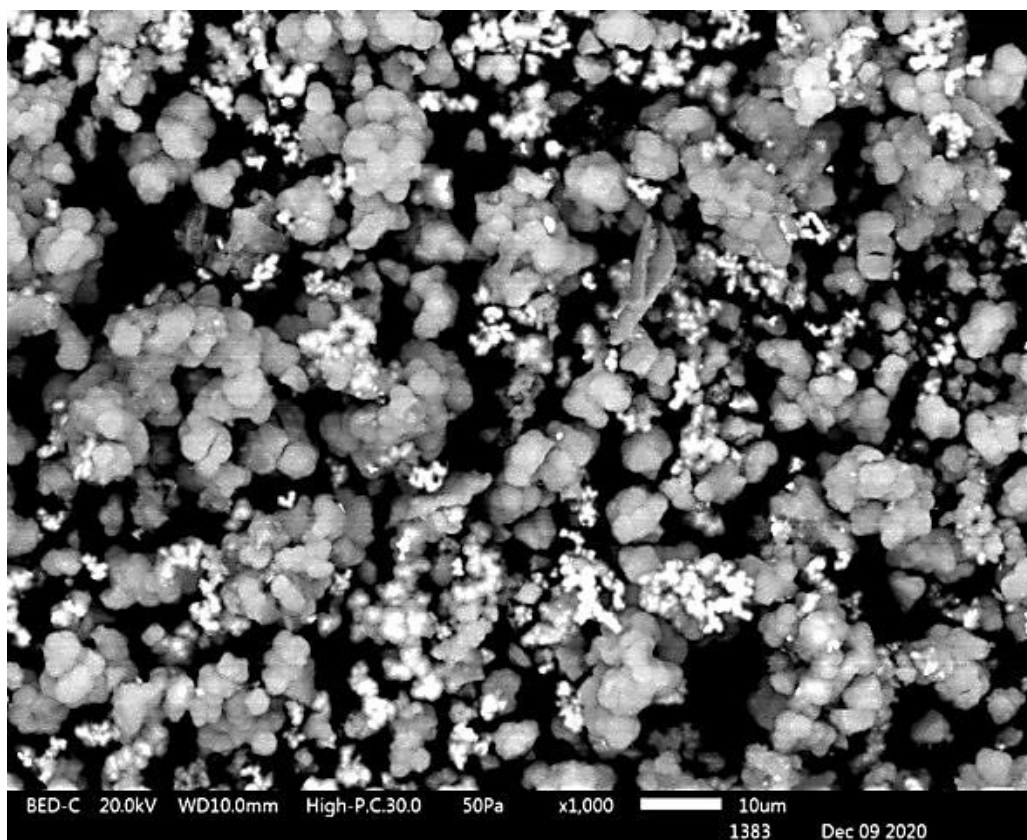


(a)

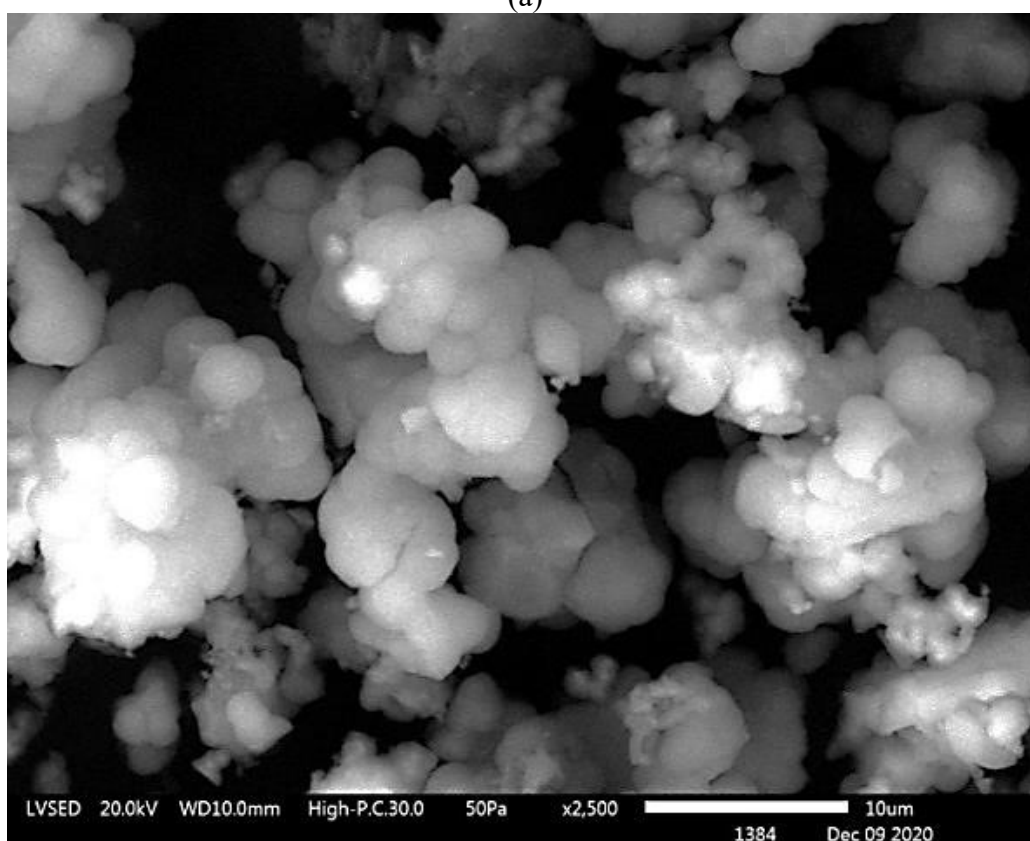


(b)

**Figure S2.** SEM images of (a, b) PW12@MIL-100(Cr).



(a)



(b)

Figure S3. SEM images of (a, b) PW4@MIL-100(Cr).



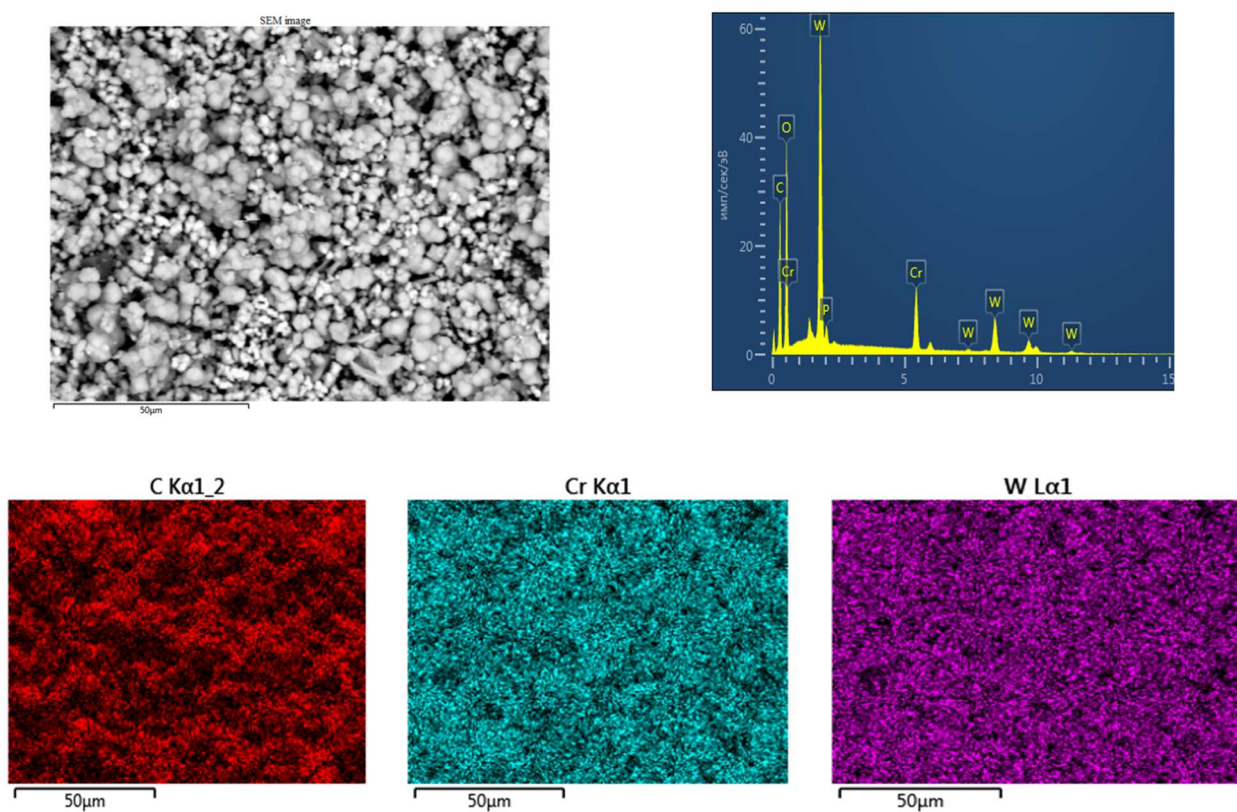


Figure S4. EDS analysis of PW12@MIL-100(Cr).

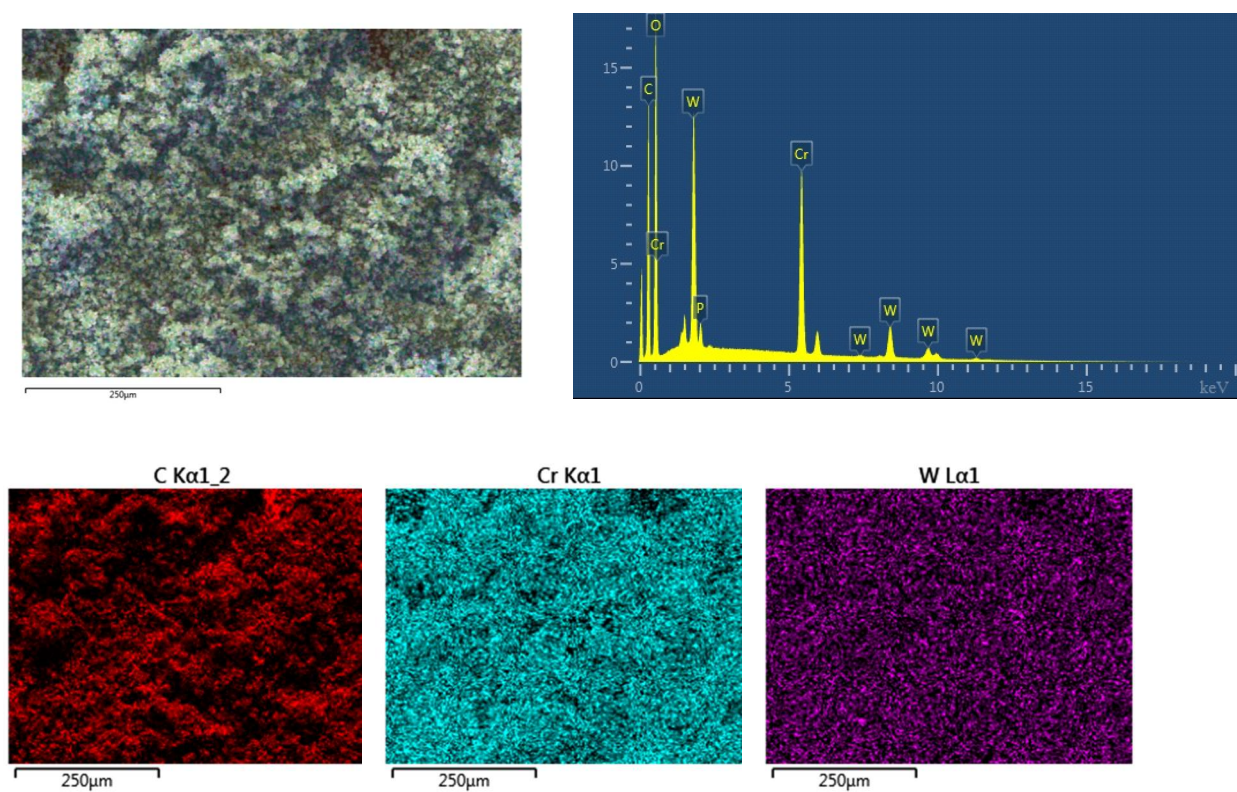


Figure S5. EDS analysis of PW4@MIL-100(Cr).

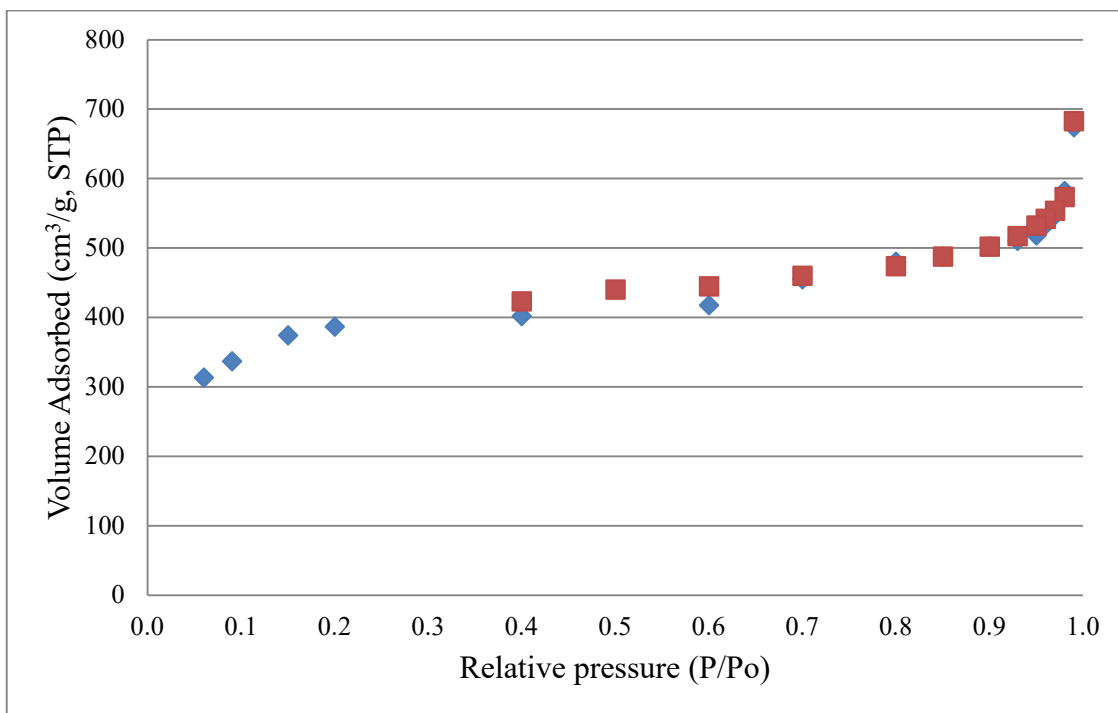


Figure S6. N<sub>2</sub> adsorption-desorption isotherm of MIL-100(Cr). ♦—adsorption curve, ■—desorption curve.

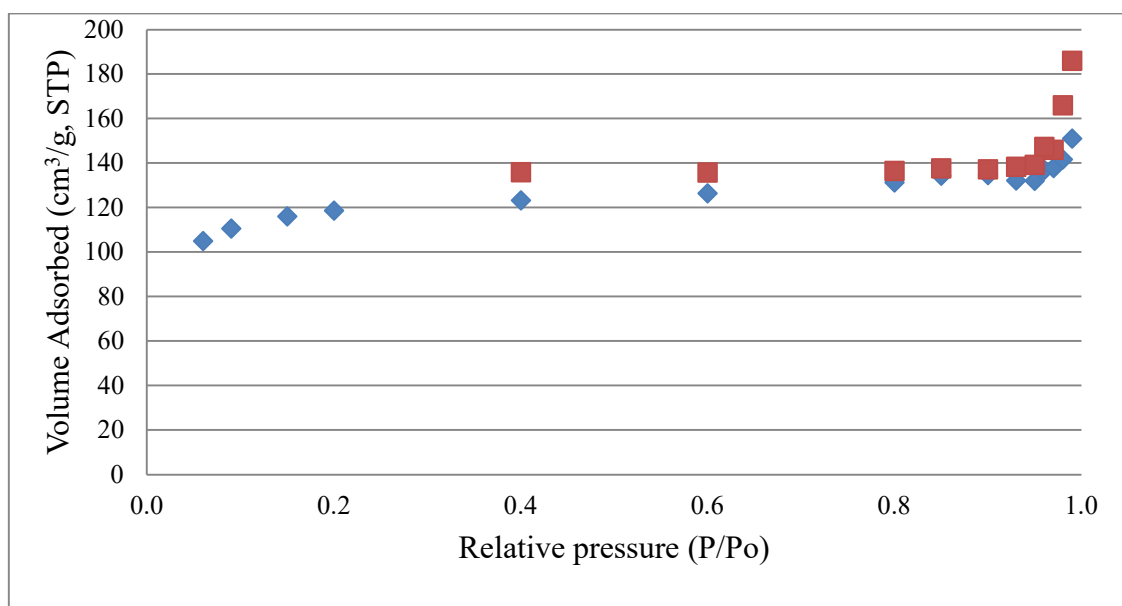


Figure S7. N<sub>2</sub> adsorption-desorption isotherm of PW12@MIL-100(Cr). ♦—adsorption curve, ■—desorption curve.

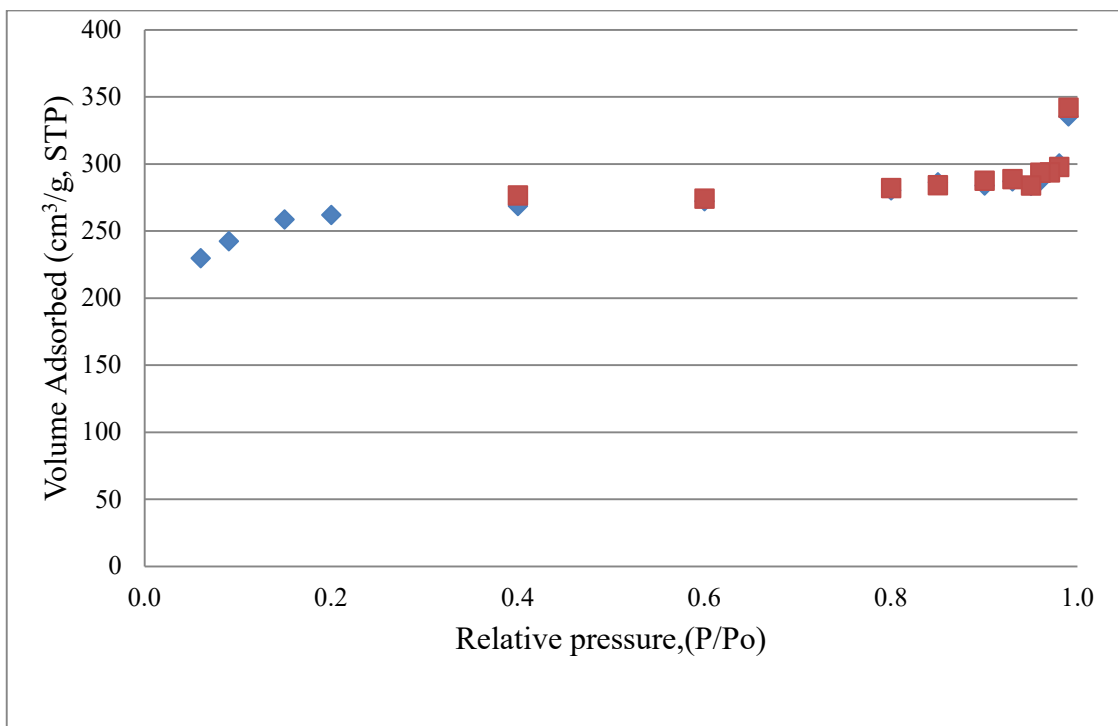


Figure S8. N<sub>2</sub> adsorption-desorption isotherm of PW4@MIL-100(Cr). ♦—adsorption curve, ■—desorption curve.

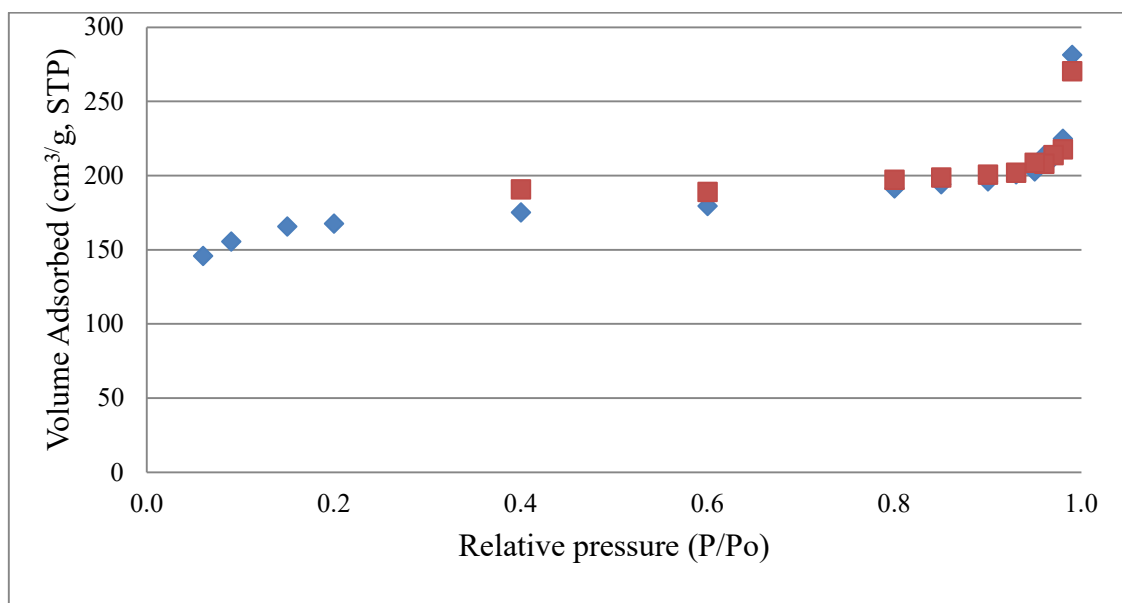


Figure S9. N<sub>2</sub> adsorption-desorption isotherm of PW4@MIL-100(Cr) after 1 cycles. ♦—adsorption curve, ■—desorption curve.

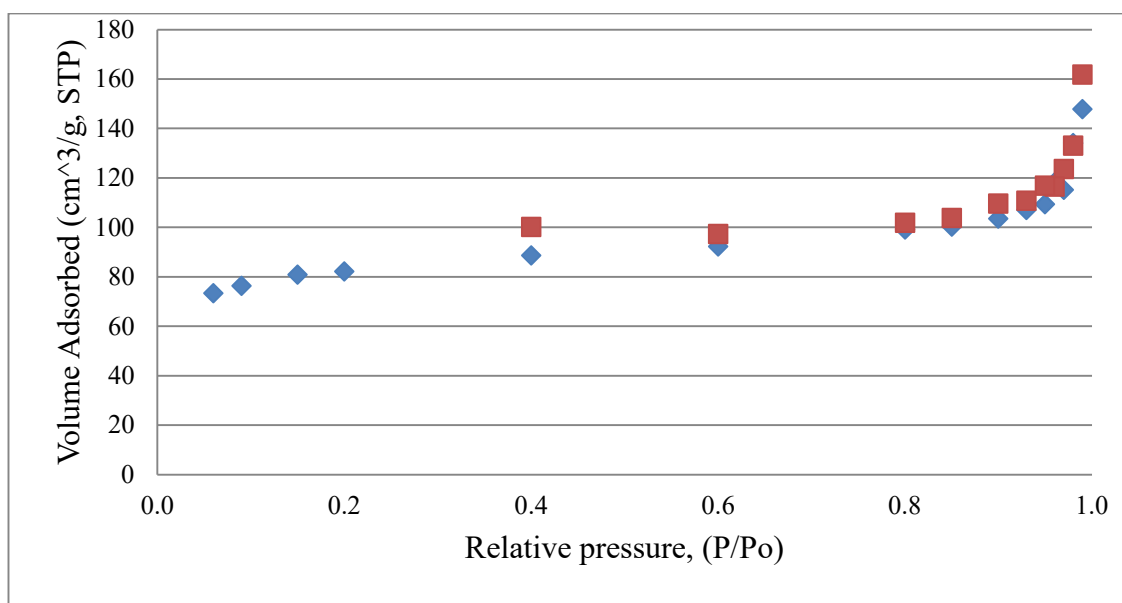
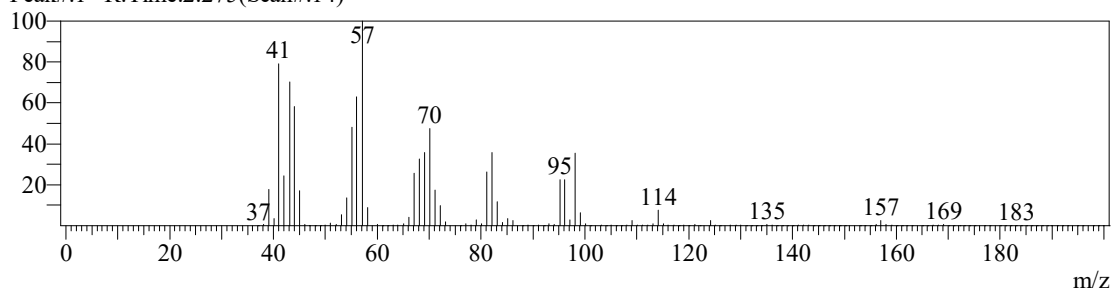


Figure S10. N<sub>2</sub> adsorption-desorption isotherm of PW4@MIL-100(Cr) after 5 cycles. ◆—adsorption curve, ■—desorption curve.



# Nonanal

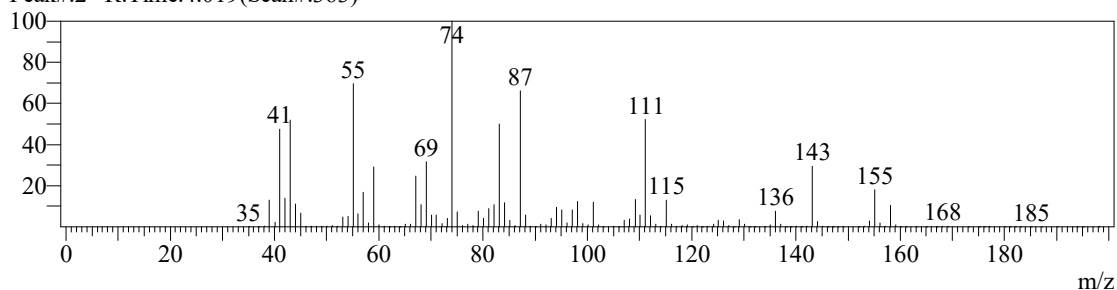
Peak#:1 R.Time:2.275(Scan#:14)



(a)

Methyl 9-oxononanoate

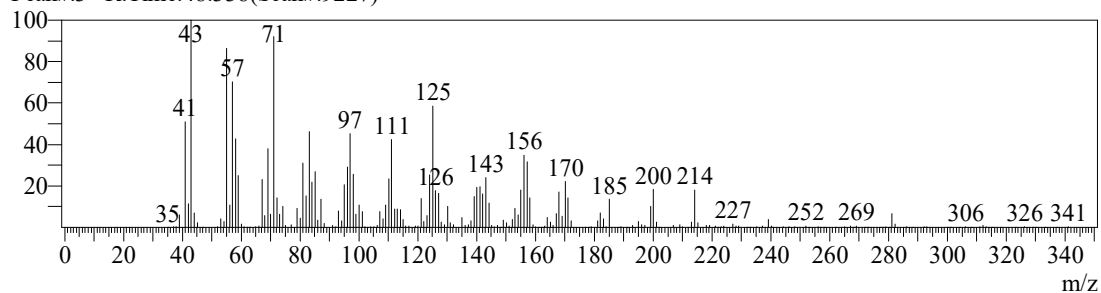
Peak#:2 R.Time:4.019(Scan#:363)



(b)

Methyl 10-oxostearate

Peak#:3 R.Time:48.338(Scan#:9227)



(c)

Figure S11. Mass spectrum of FAME oxidation products (GC-MS). (a) methyl 5-oxo-octadecanoate, (b) Methyl 9-oxononanoate, (c) methyl 10-oxo-octadecanoate.

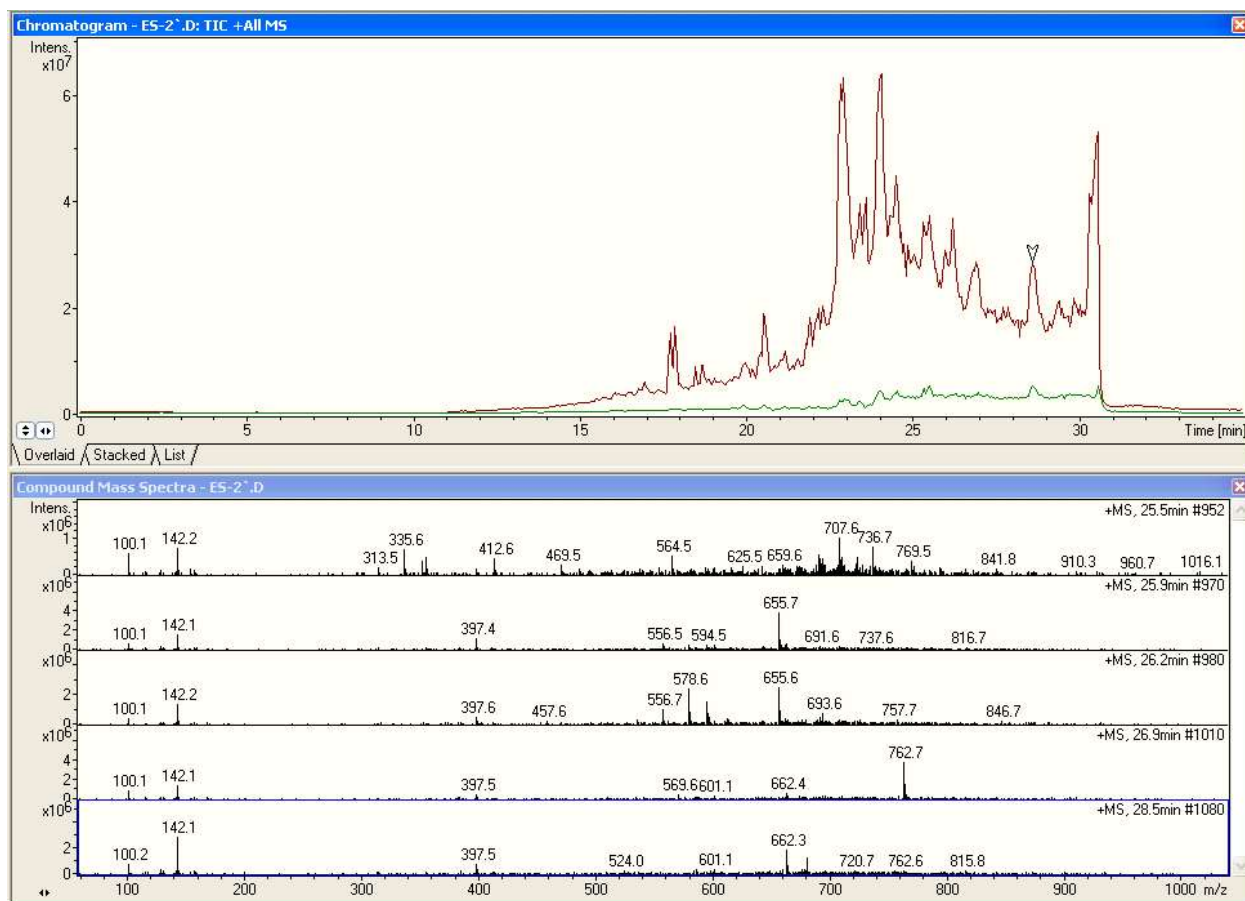
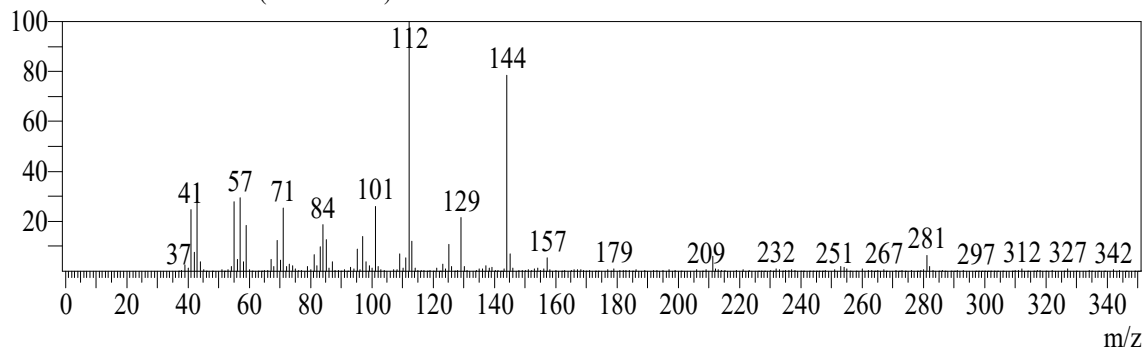


Figure S12. Mass spectrum of FAME Oligomerization products (HPLC-MS). Mass spectrum (positive) of peaks with a retention time of 25.5 min; 25.9 min; 26.2 min; 26.9 min; 28.5 min.

Methyl 5-oxo-octadecanoate

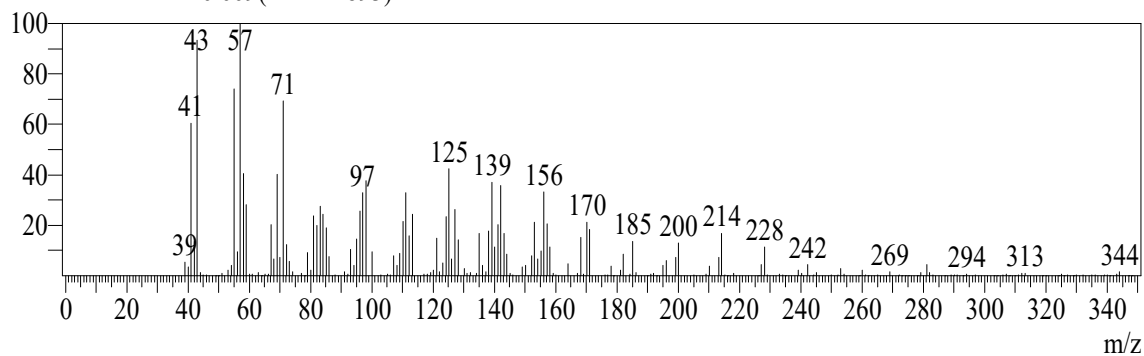
Peak#:1 R.Time:26.015(Scan#:4762)



(a)

Methyl 10-oxo-octadecanoate

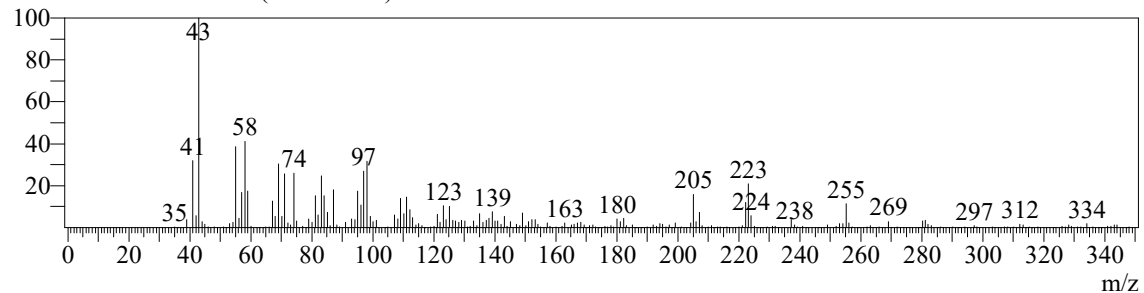
Peak#:2 R.Time:26.669(Scan#:4893)



(b)

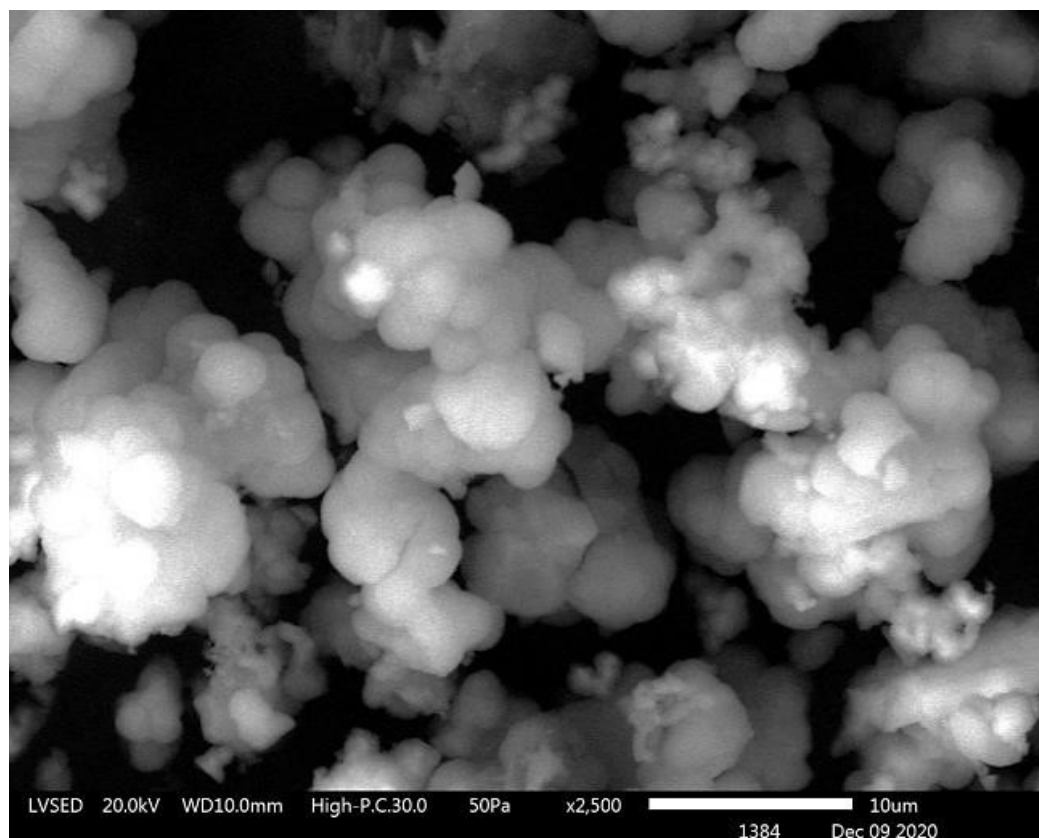
Methyl 17-oxo-octadecanoate

Peak#:3 R.Time:27.724(Scan#:5104)

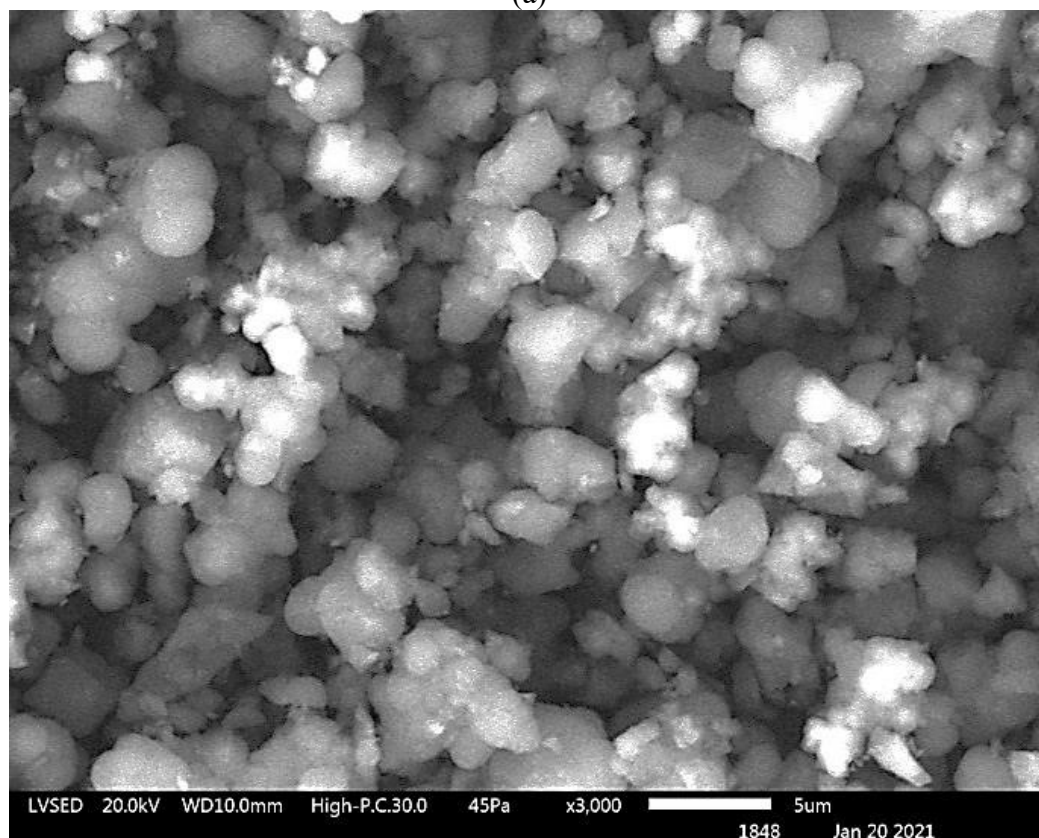


(c)

Figure S13. Mass spectrum of methyl stearate oxidation products (GC-MS). (a) methyl 5-oxo-octadecanoate, (b) methyl 10-oxo-octadecanoate, (c) methyl 17-oxo-octadecanoate.



(a)



(b)

Figure S14. SEM images of (a) fresh PW4@-MIL-100(Cr) and (b) spent PW4@-MIL-100(Cr) powders.

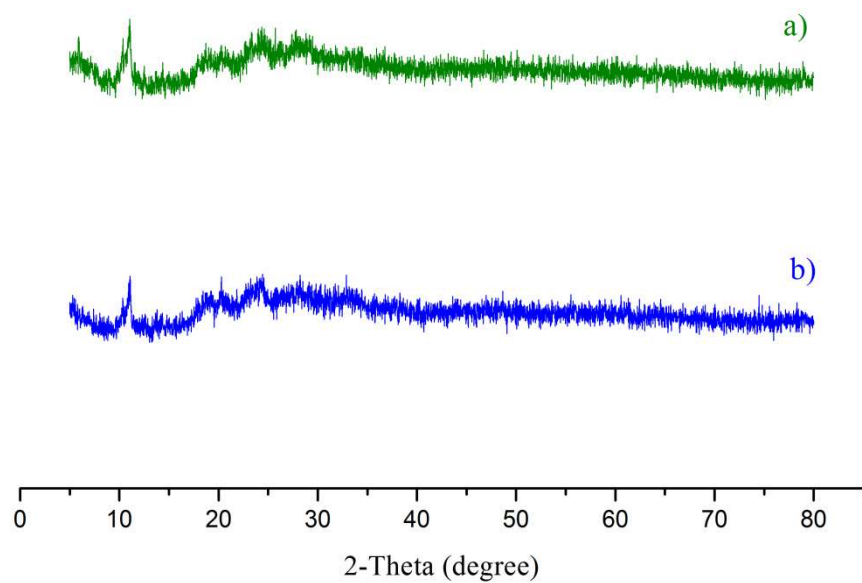


Figure S15. XRD patterns of PW4@MIL-100(Cr) fresh prepared (a) and after 5 catalytic cycle (b).

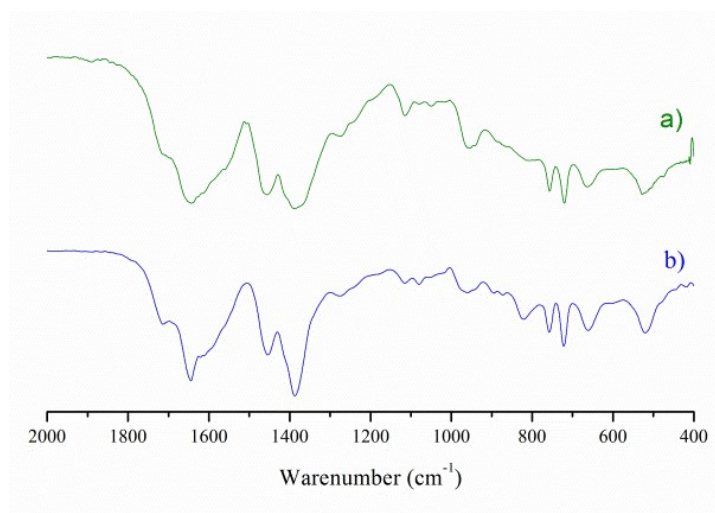


Figure S16. FTIR spectra of PW4@MIL-100(Cr) fresh prepared (a) and after 5 catalytic cycle (b).