

Supporting information

GS-MS chromatograms and spectra for hydrogenation of CMF over 0.5% Pd/C^N and 5% Pd/C^S catalysts-

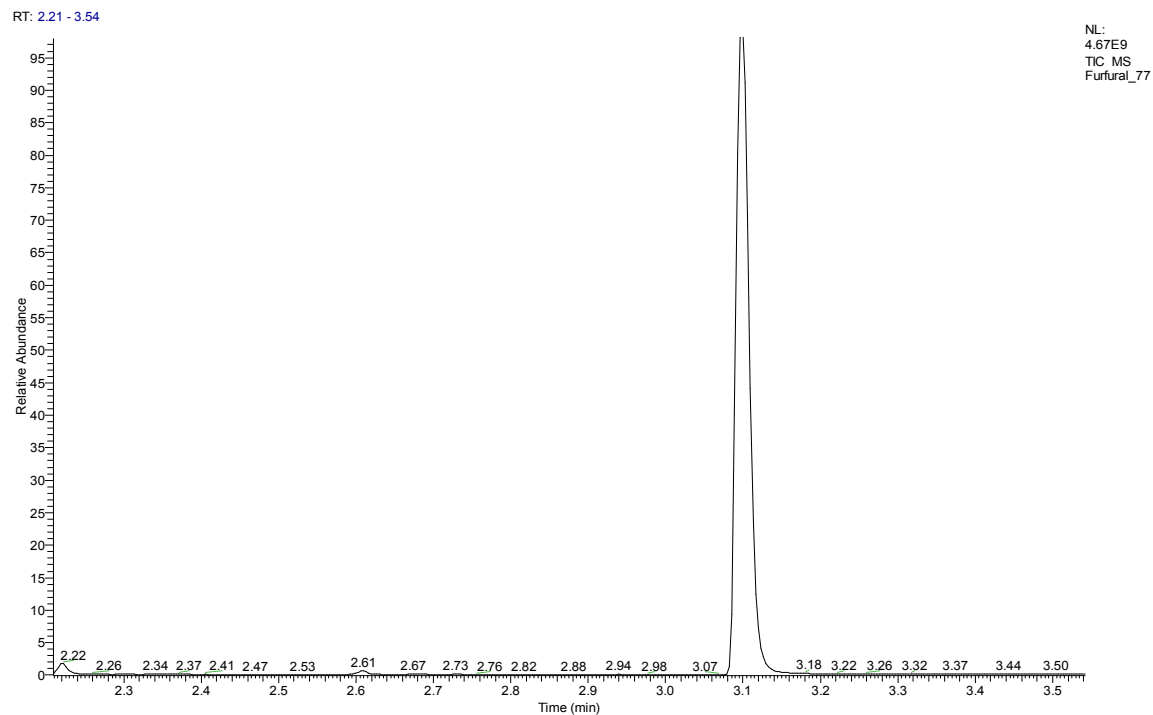


Fig. S1 GC-MS chromatogram from a reaction performed with 0.3g CMF, 40ml DCE, 11bar H₂, 70°C, 0.1g 0.5% Pd/C^N catalyst and reaction time of 5h.

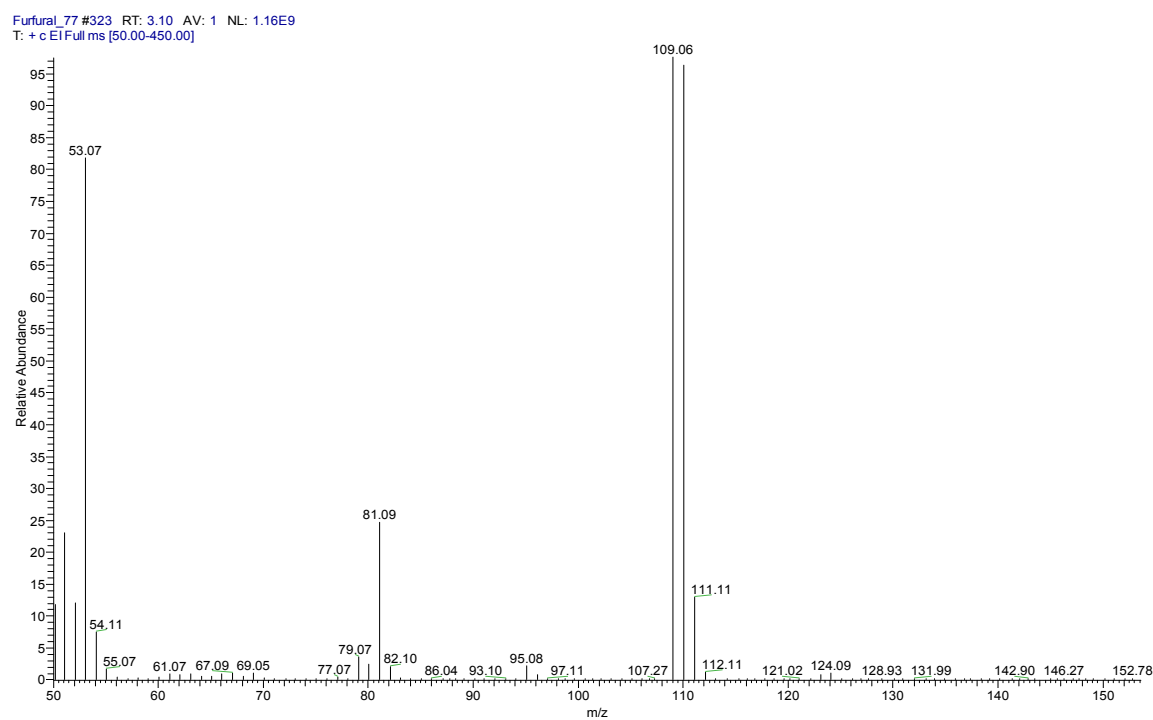


Fig. S2 MS spectrum for the peak in the chromatogram in Fig. S1, identified as 5-methyl furfural.

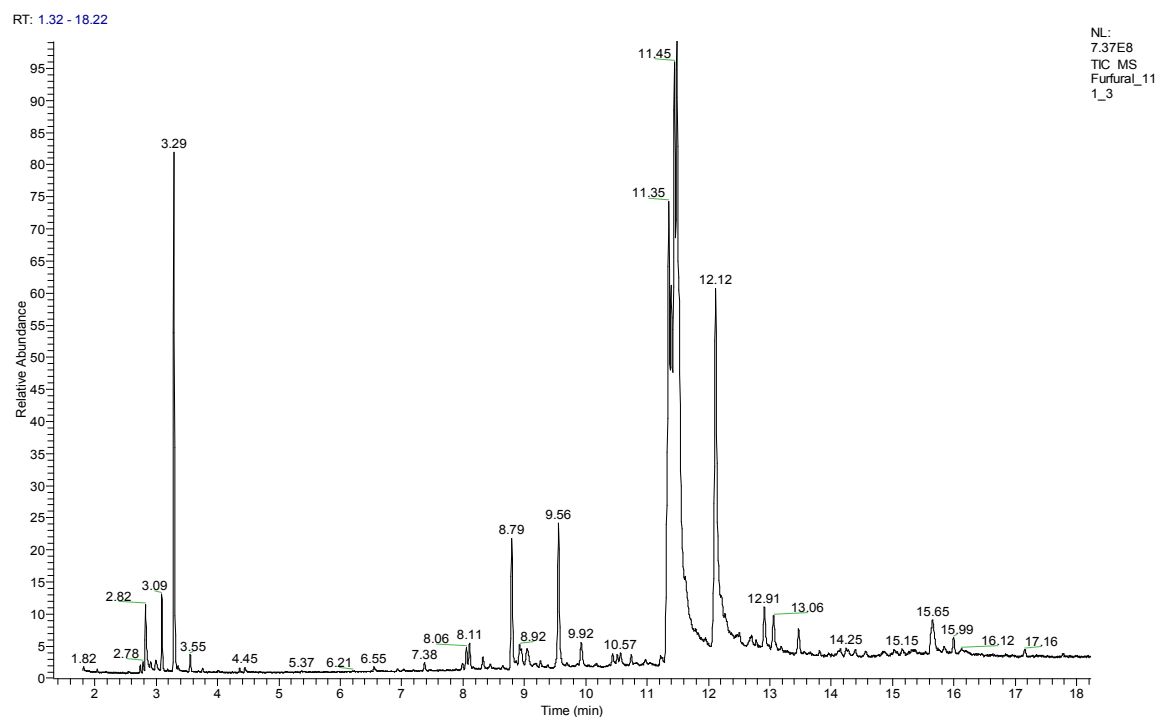


Fig. S3 GC-MS chromatogram from a reaction performed with 0.3g CMF, 40ml DCE, 11bar H₂, 50°C, 0.03g 5% Pd/C^S catalyst and reaction time of 5h.

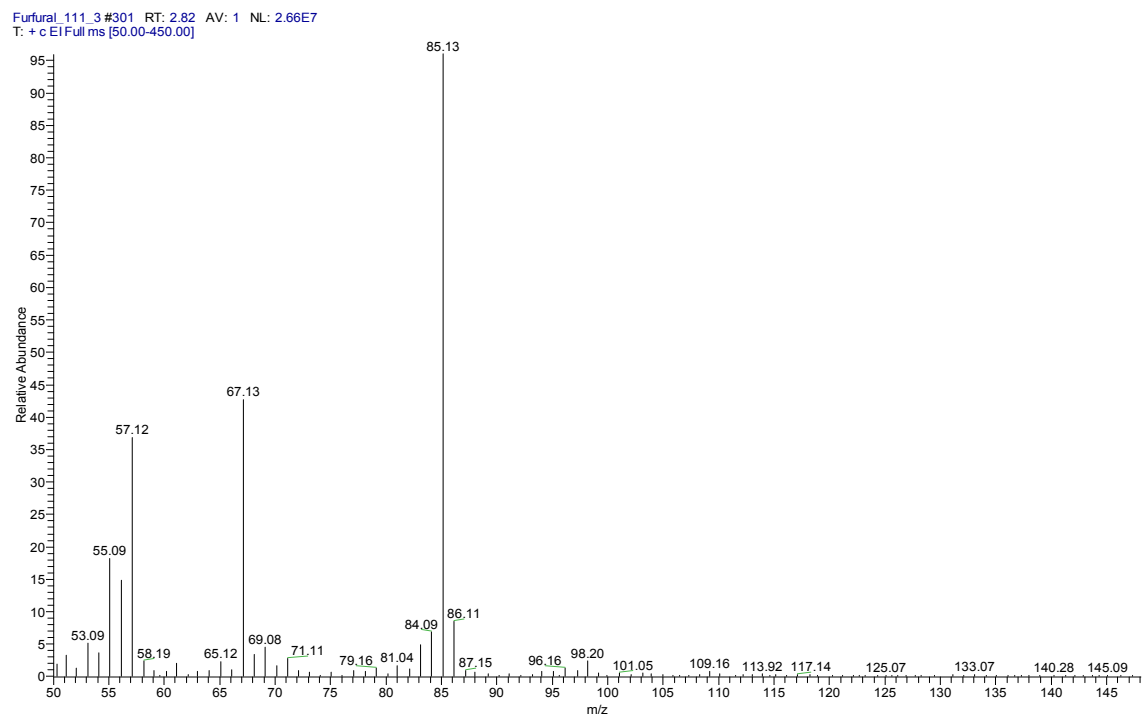


Fig. S4 MS spectrum for the peak at retention time of 2.82min in the chromatogram in Fig. S3, identified as 5-methyltetrahydrofurfuryl alcohol.

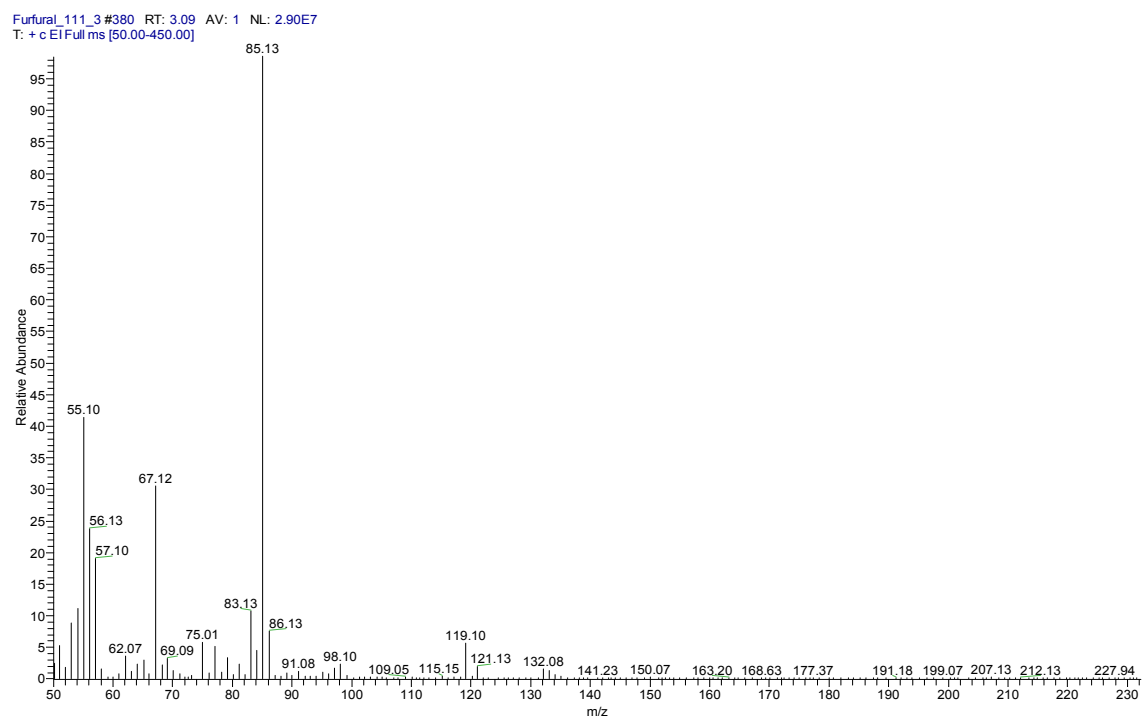


Fig. S5 MS spectrum for the peak at retention time of 3.09min in the chromatogram in Fig. S3, identified as 2-(chloromethyl)-5-methyl-2,3-dihydrofuran.

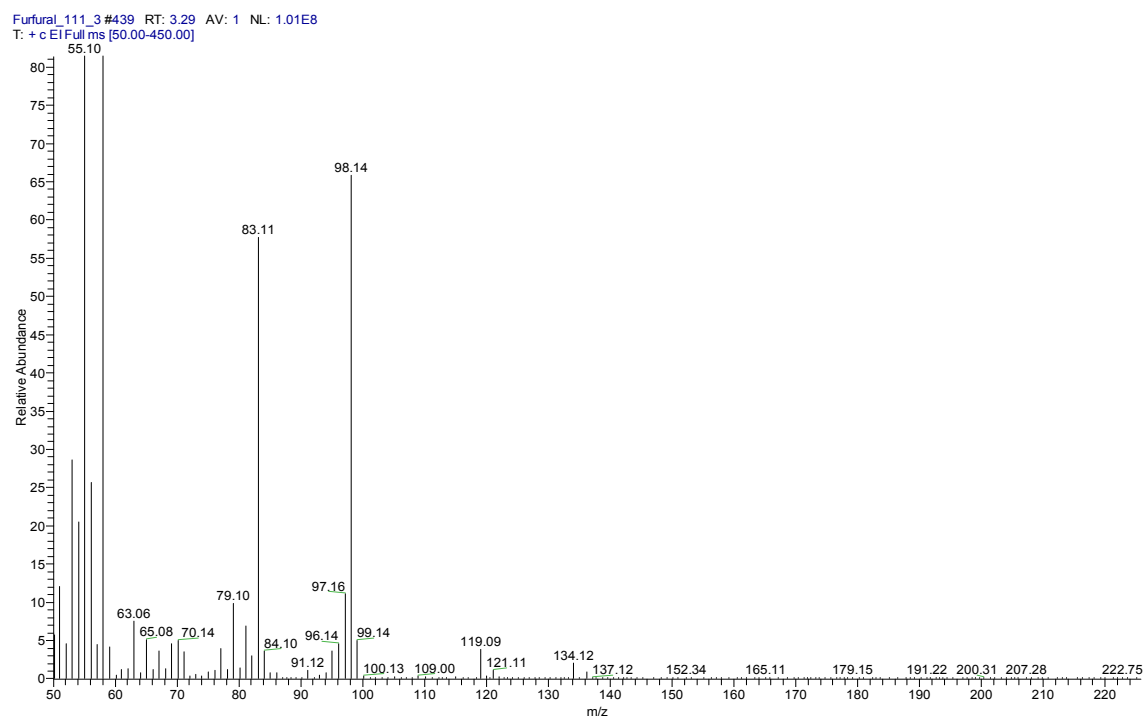


Fig. S6 MS spectrum for the peak at retention time of 3.29min in the chromatogram in Fig. S3, identified as 2-(chloromethyl)-5-methyltetrahydrofuran.

Furfural_111_3 #2058 RT: 8.80 AV: 1 NL: 3.14E7
T: + c EI Full ms [50.00-450.00]

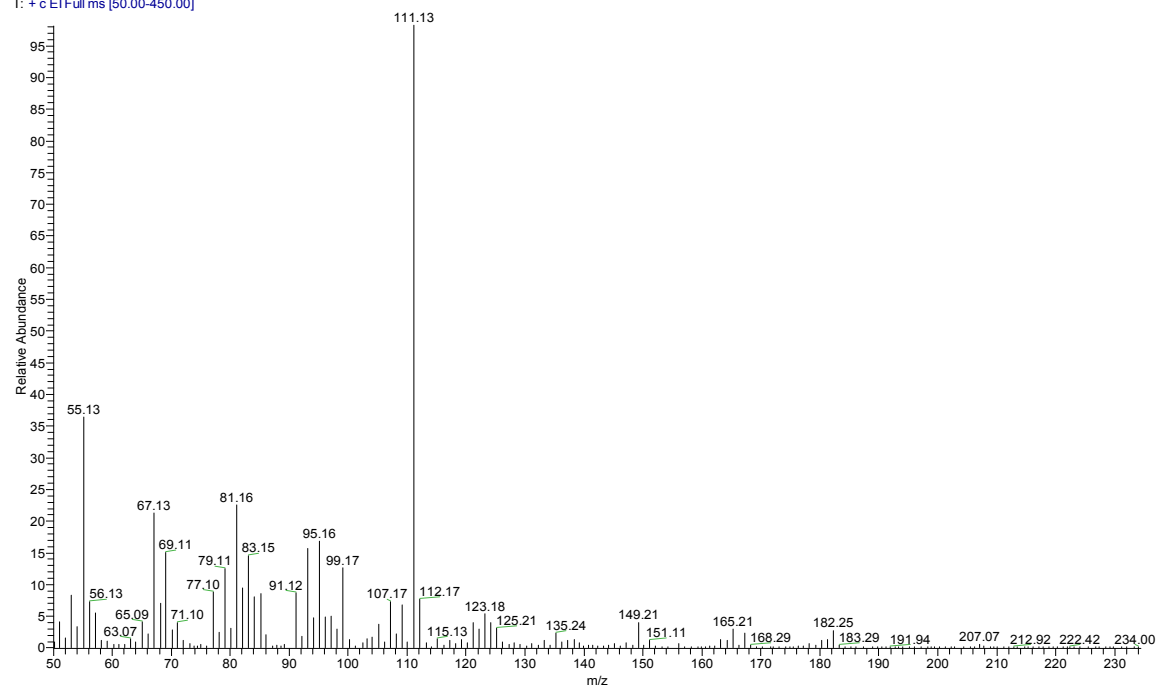


Fig. S7 MS spectrum for the peak at retention time of 8.80min in the chromatogram in Fig. S3, identified as 5-(5-methyl-2,3-dihydrofuran-2-yl)hexan-2-one.

Furfural_111_3 #2810 RT: 11.35 AV: 1 NL: 1.45E8
T: + c EI Full ms [50.00-450.00]

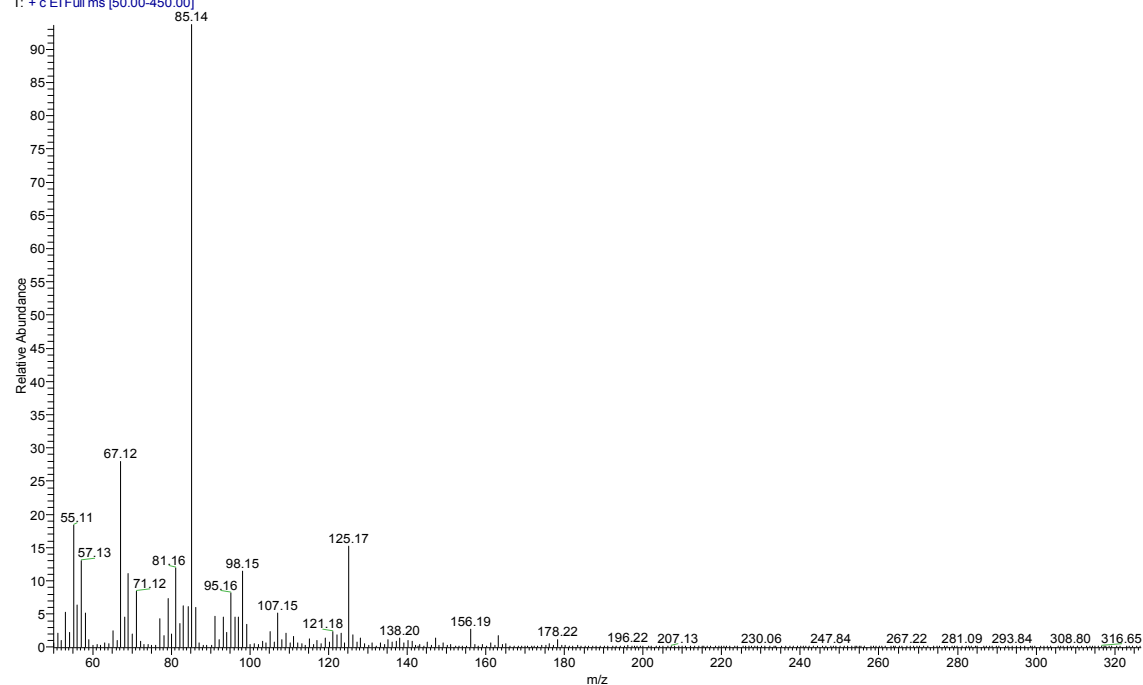


Fig. S8 MS spectrum for the peak at retention time of 11.35min in the chromatogram in Fig. S3, identified as an isomer of 2-((2E,4E)-hexa-2,4-dien-2-yl)-2,5-dimethyl-2,3-dihydrofuran.

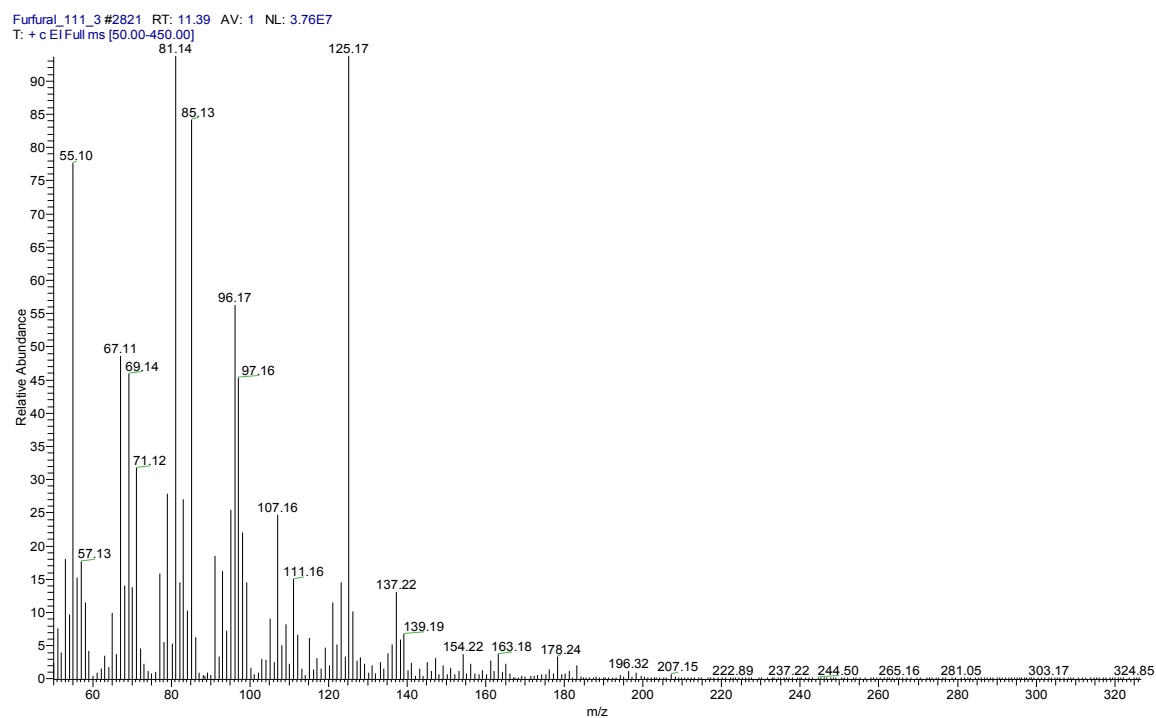


Fig. S9 MS spectrum for the peak at retention time of 11.39min in the chromatogram in Fig. S3, identified as 5-(2,5-dimethyl-2,3-dihydrofuran-2-yl)hexan-2-one.

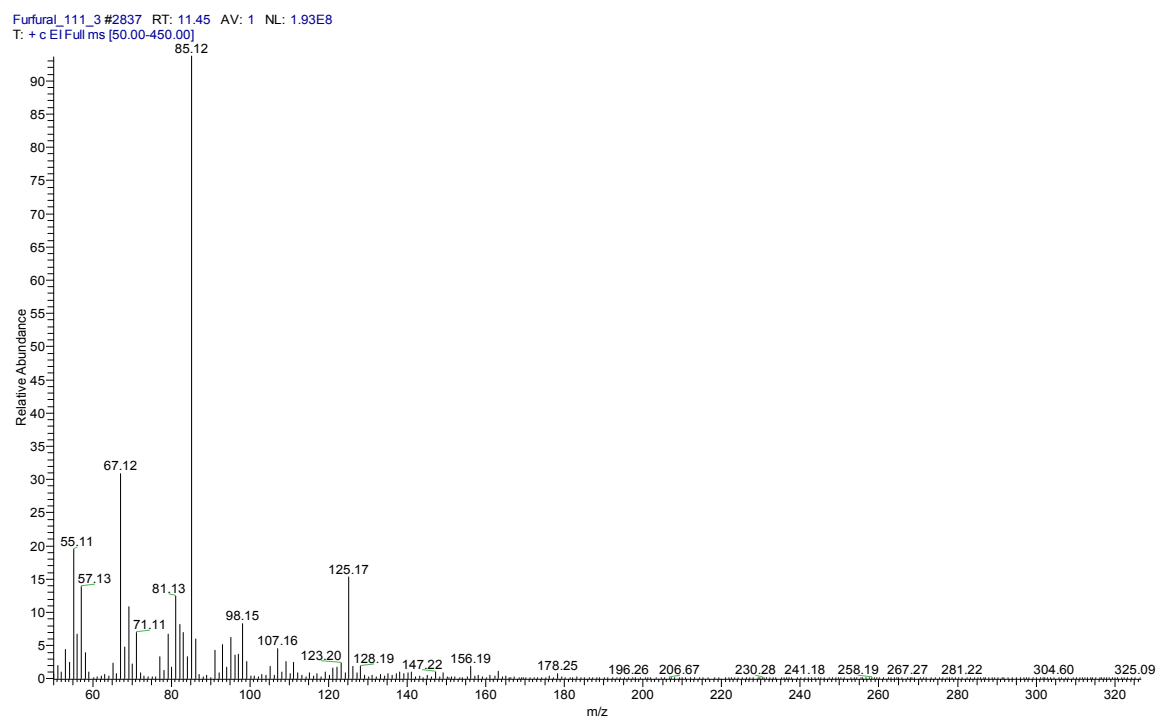


Fig. S10 MS spectrum for the peak at retention time of 11.45min in the chromatogram in Fig. S3, identified as an isomer of 2-((2E,4E)-hexa-2,4-dien-2-yl)-2,5-dimethyl-2,3-dihydrofuran.

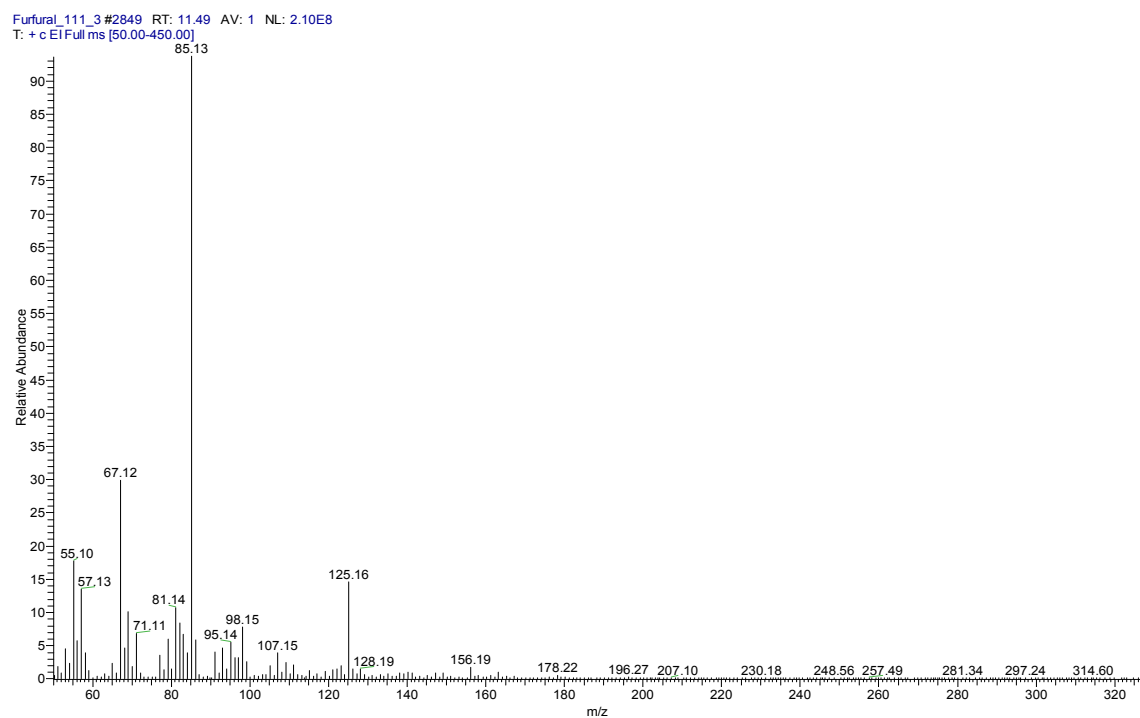


Fig. S11 MS spectrum for the peak at retention time of 11.49min in the chromatogram in Fig. S3, identified as an isomer of 2-((2E,4E)-hexa-2,4-dien-2-yl)-2,5-dimethyl-2,3-dihydrofuran.

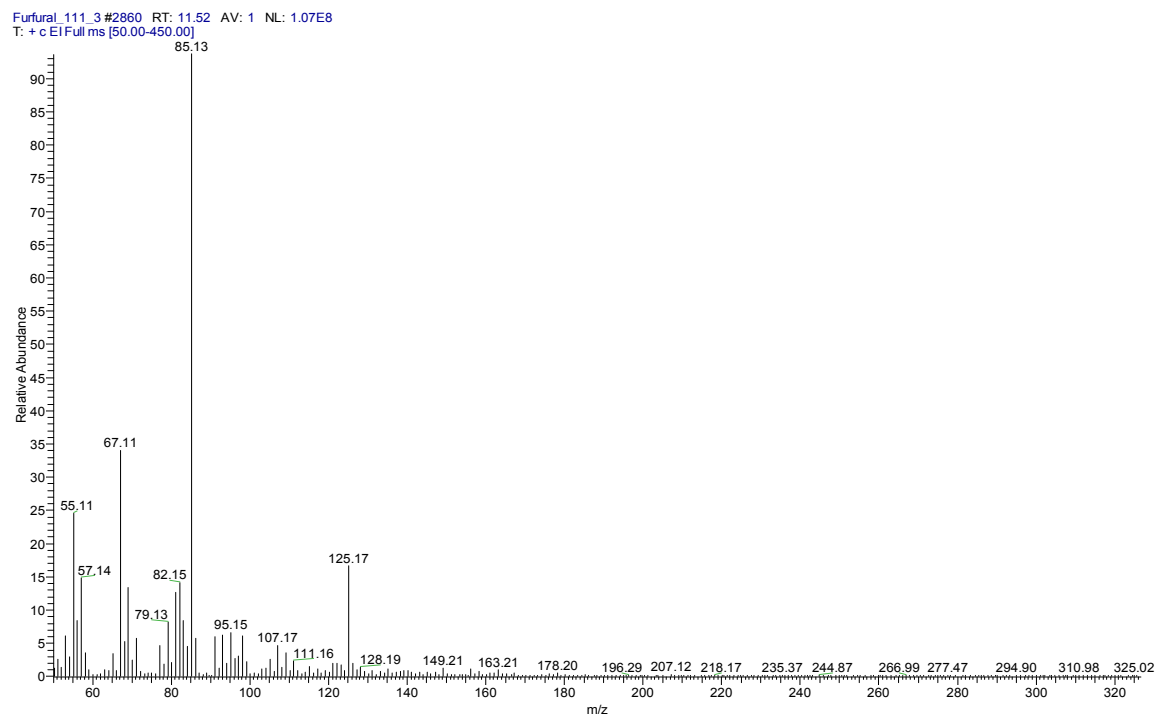


Fig. S12 MS spectrum for the peak at retention time of 11.52min in the chromatogram in Fig. S3, identified as an isomer of 2-((2E,4E)-hexa-2,4-dien-2-yl)-2,5-dimethyl-2,3-dihydrofuran.

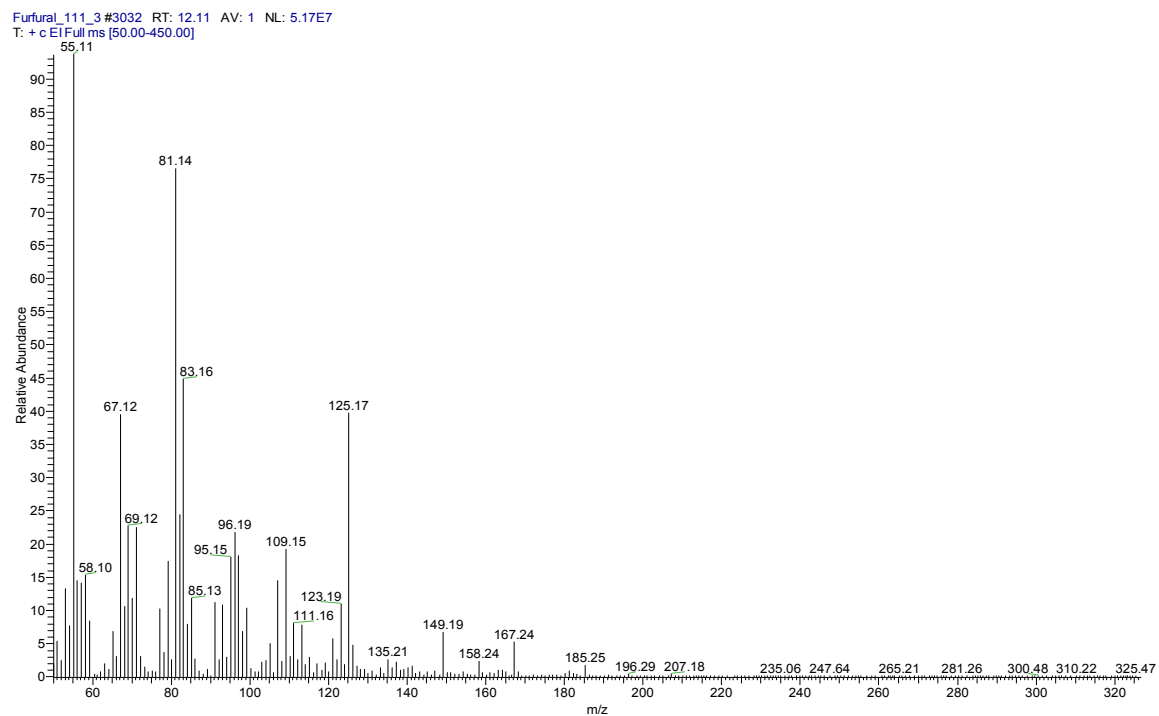


Fig. S13 MS spectrum for the peak at retention time of 12.11 min in the chromatogram in Fig. S3, identified as 5-(5-methyltetrahydrofuran-2-yl)hexan-2-ol.

FT-IR and NMR spectra for the products mixture obtained from the reaction of CMF with 5% Pd/C^S catalyst-

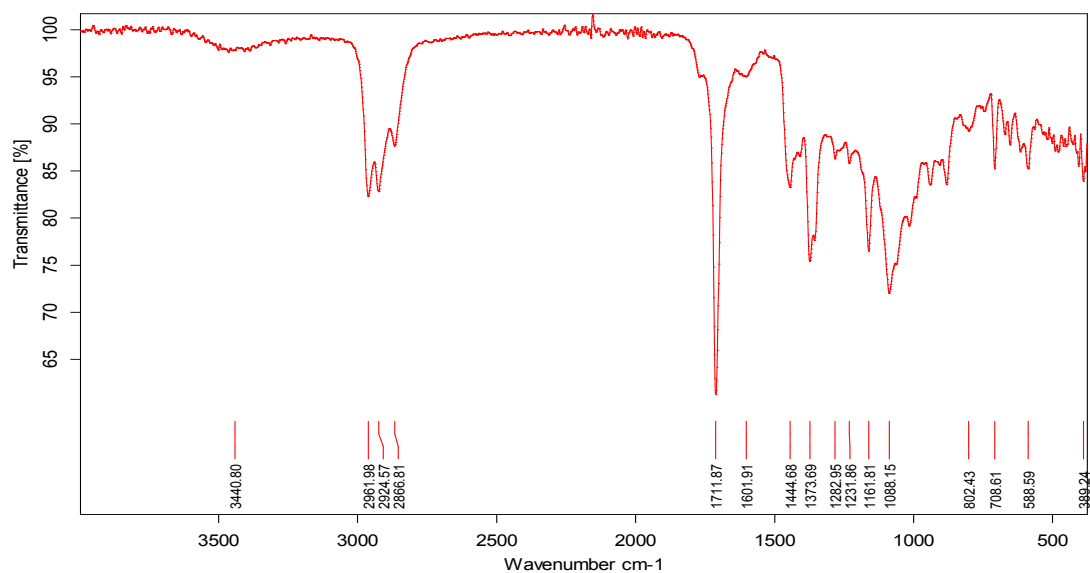


Fig. S14 FT-IR spectrum for the products mixture obtained from reaction performed with 0.3g CMF, 40ml DCE, 11bar H₂, 50°C, 0.03g 5% Pd/C^S catalyst and reaction time of 5h (The same sample as in Fig. S3). The spectrum bands in 1711.87cm⁻¹ and 3440.80cm⁻¹ indicate on the presence of carbonyl and hydroxyl groups.

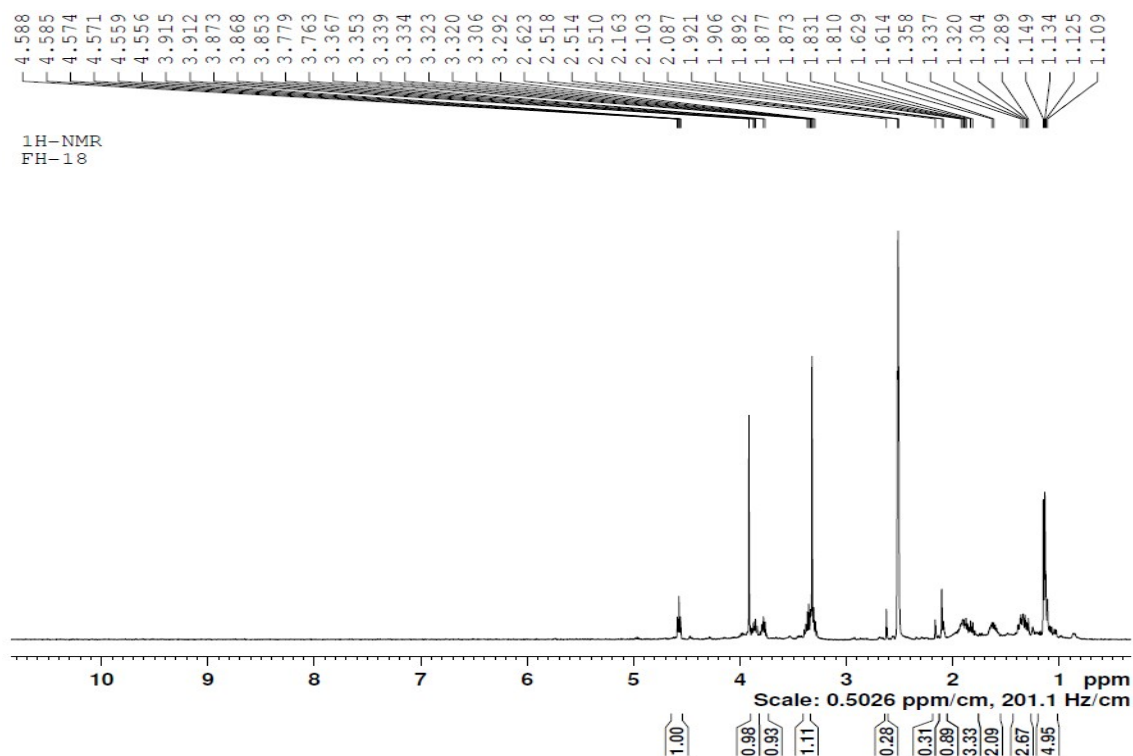


Fig. S15 Proton NMR spectrum for the products mixture obtained from reaction performed with 0.3g CMF, 40ml DCE, 11bar H₂, 50°C, 0.03g 5% Pd/C^S catalyst and reaction time of 5h (The same sample as in Fig. S3). The products mixture was dissolved in DMSO-d₆ and placed in NMR tube prior measurement. The characteristic aromatic and aldehyde hydrogen atoms of furfural are prominently absent.

High magnification SEM images of various catalyst-

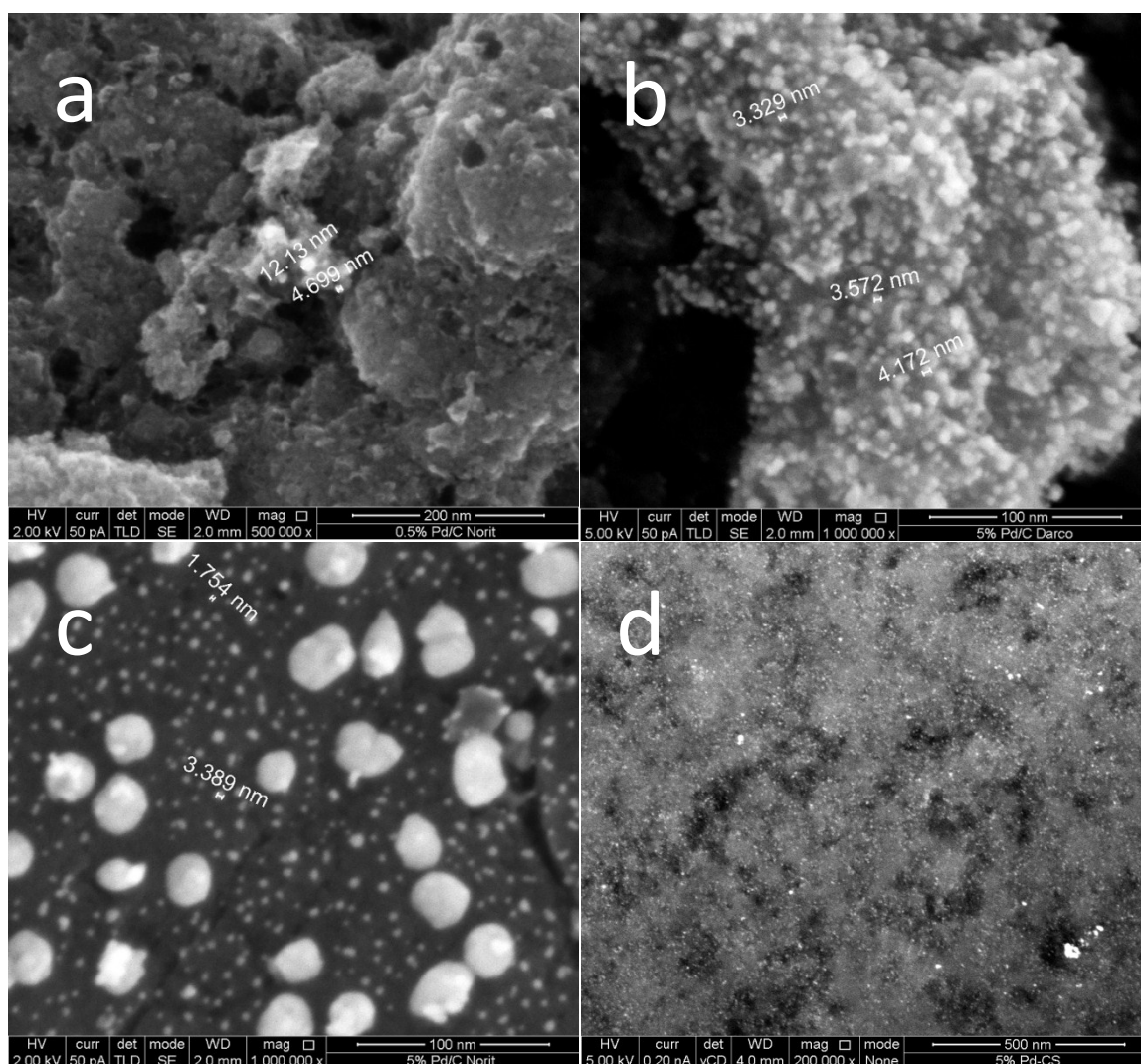


Fig. S16 High magnification SEM images of (a) 0.5% Pd/C^N, (b) 5% Pd/C^D, (c) 5% Pd/C^N and (d) 5% Pd/C^S.

SEM images of 0.5% Pd/C^N catalyst before and after reaction-

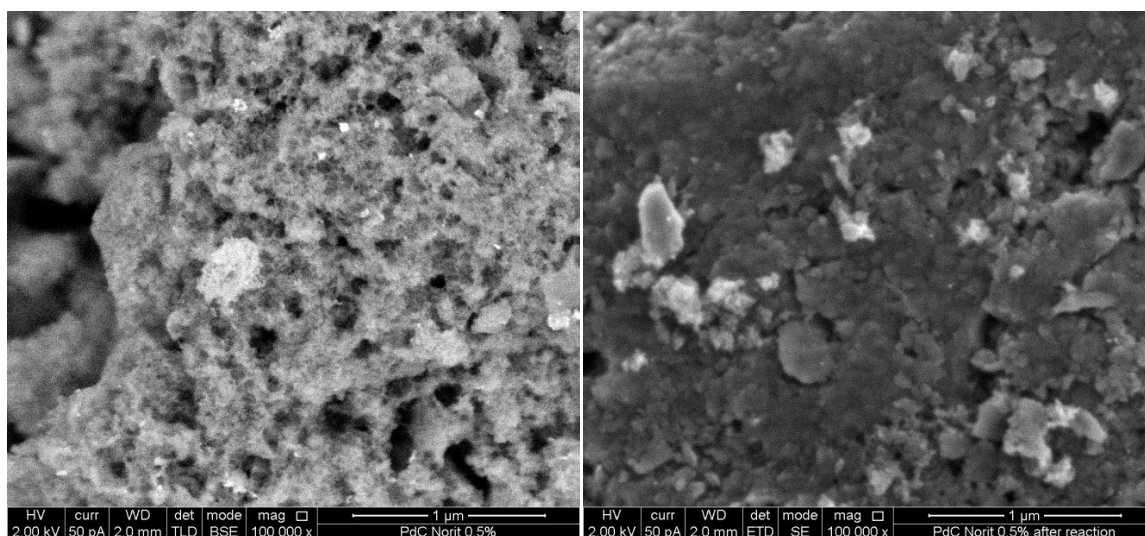


Fig. S17 SEM images of 0.5% Pd/C^N catalyst before CMF hydrogenation reaction (the left image) and after reaction (the right image). Reaction conditions: 0.3g CMF, 40ml DCE, 0.1g 0.5% Pd/C^N, 70°C, 11bar H₂ and reaction time of 5h.