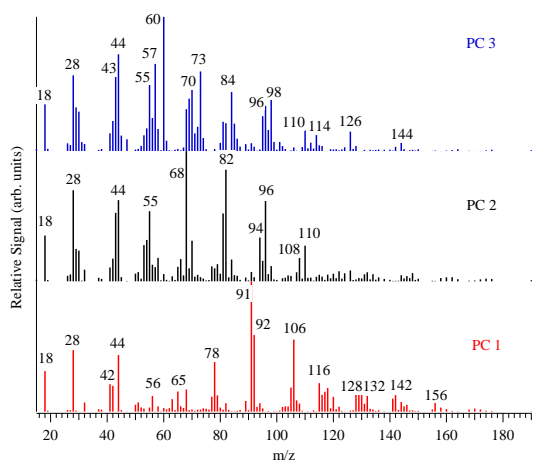
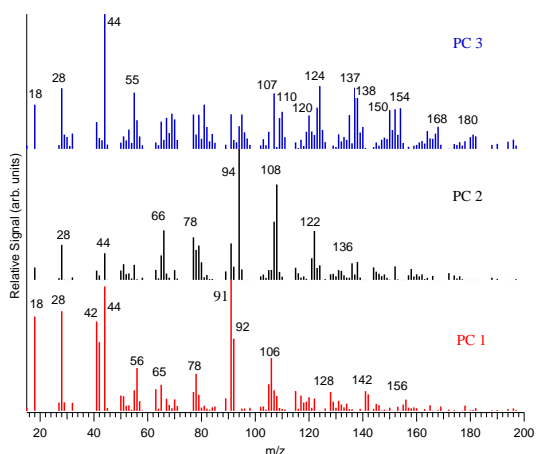


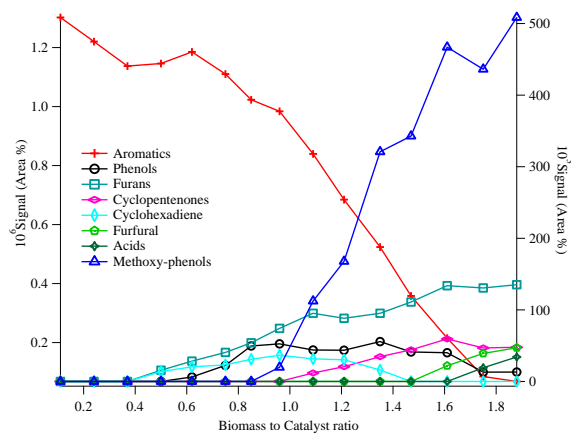
## Supplementary Figures



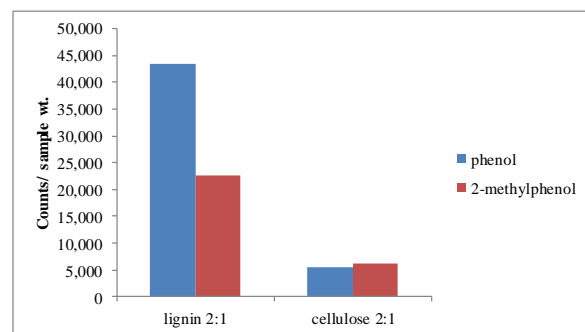
**Fig. S1.** The reconstructed spectra for each factor (PC 1 to PC 3) from MCR-ALS analysis of CFP of 50 boats of cellulose over 1.0g HZSM-5 in the horizontal reactor, showing changes in the product stream as the catalyst deactivates..



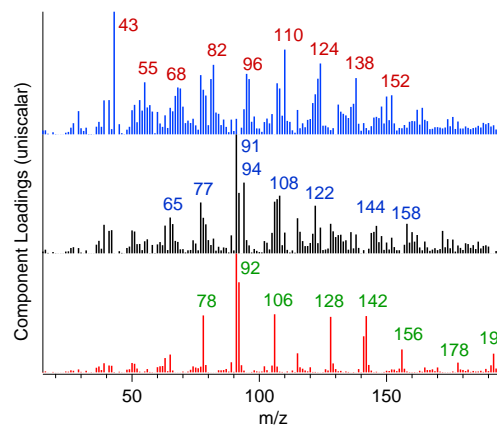
**Fig. S2.** The reconstructed spectra for each factor (PC 1 to PC 3) from MCR-ALS analysis of CFP of 34 boats of lignin over 1.0g HZSM-5 in the horizontal reactor showing change in product composition as the catalyst deactivates.



**Fig. S3.** Variation of py-GCMS products with deactivation of HZSM-5 catalyst.



**Fig. S4.** Observation of phenol and cresol during CFP of lignin and cellulose using py-GCMS. The biomass-to-catalyst ratio used was 2:1.



**Fig. S5.** The reconstructed spectra for each factor (PC 1 to PC 3) from MCR-ALS analysis of CFP of pine over ZSM-5 in the microreactor.



**Fig. S6.** Coked catalyst samples obtained from the microreactor experiments. The catalyst samples were collected at biomass-to-catalyst ratios: 0.4 (stage 1), 1.0 (stage 2), 1.7 (stage 3) and 5 (stage 4).