Electronic Supplementary Material (ESI) for RSC Advances.
This journal is © The Royal Society of Chemistry 2016

Supporting information for:

Exploratory catalyst screening studies on the liquefaction of model humins from C6 sugars.

Y. Wang, S. Agarwal, Z. Tang, H. J. Heeres*

Chemical Engineering Department, ENTEG, University of Groningen, Nijenborg 4, 9747 AG Groningen, The Netherlands

* Corresponding author: h.j.heeres@rug.nl

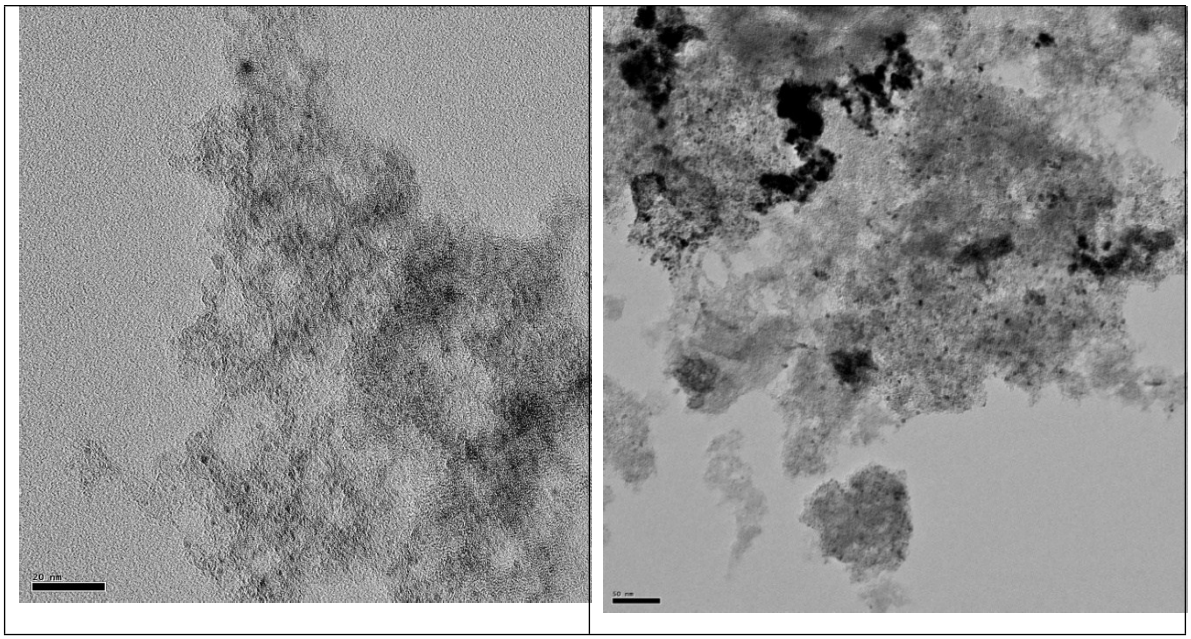


Figure S1. TEM pictures of Ru/C (left) and Rh/C (right)

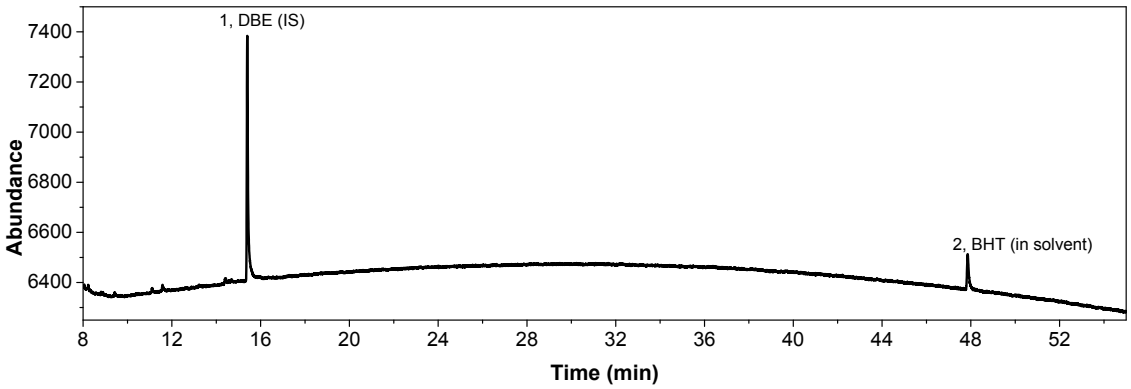


Figure S2. GC-MS/FID spectrum of a liquid product from an experiment with Pd/C (400 °C, 3 h).

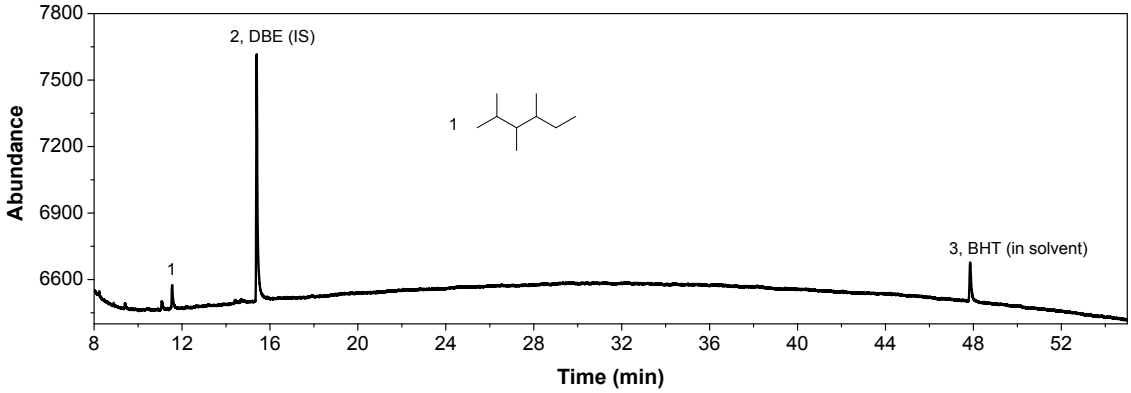


Figure S3. GC-MS/FID spectrum of a liquid product from an experiment with Rh/C (400 °C, 3 h).

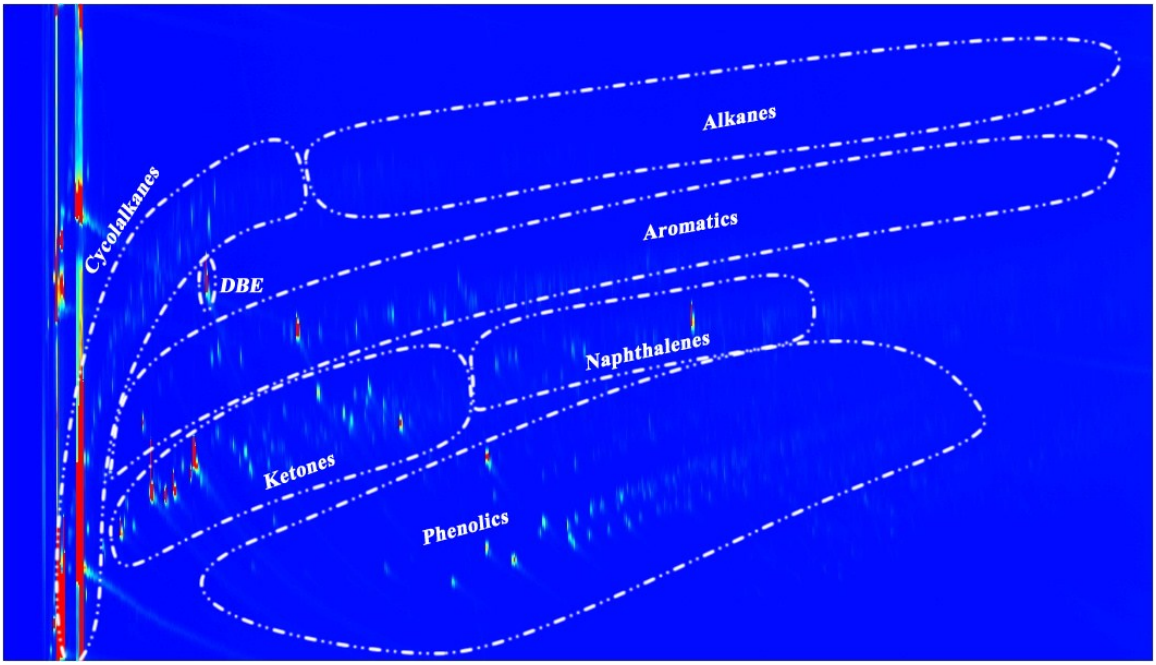


Figure S4. GC×GC-FID chromatogram for product oil from an experiment with Ru/C (400 °C, 3 h). The large peak in the naphtalenes area is BHT, the antioxidant in THF. DBE is the internal standard.

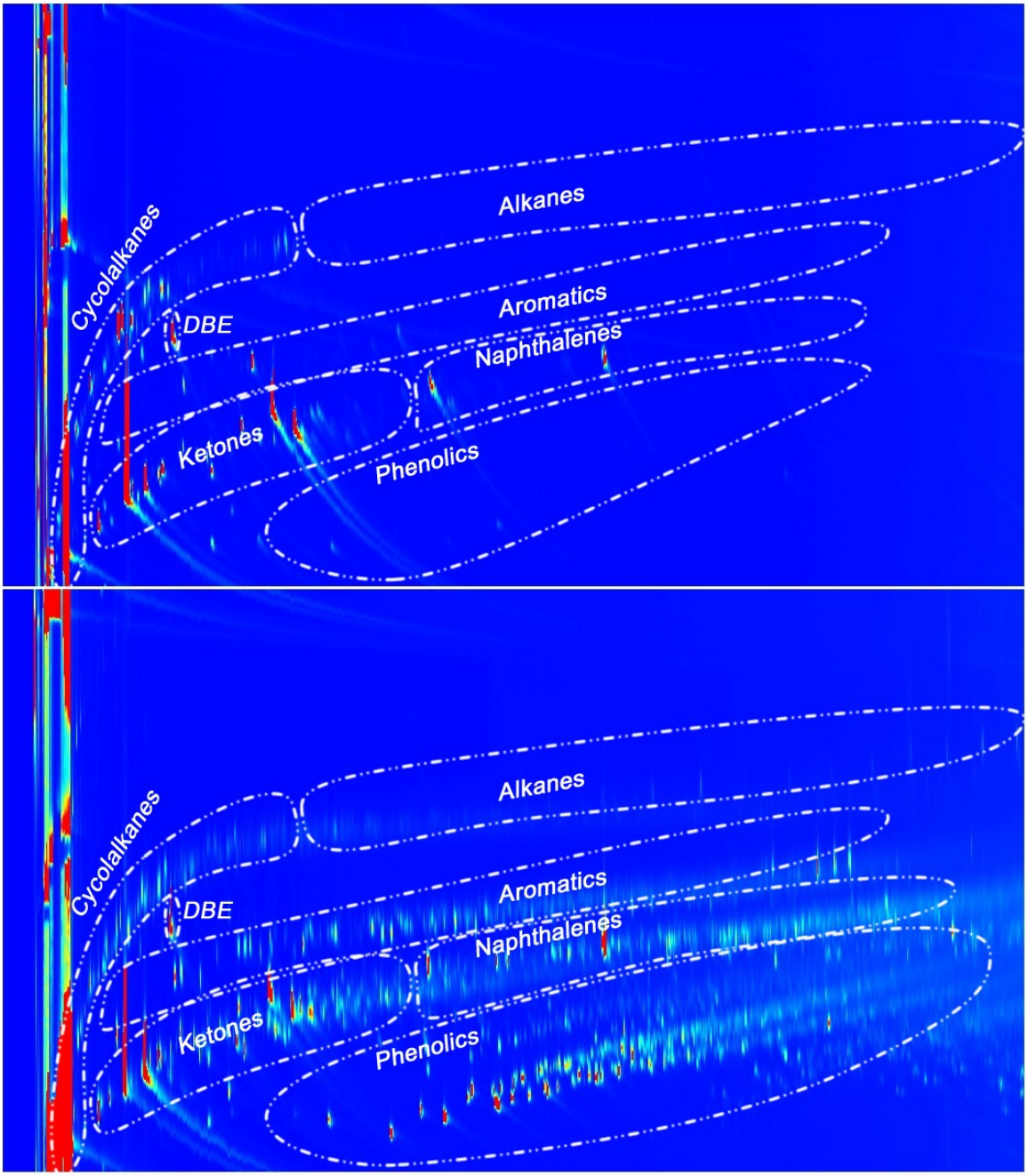


Figure S5. GCxGC chromatrograms for the blank (top) and regular reaction (bottom) with Pt/C. The larger peak in the naphthalene area is BHT, the stabiliser in THF (400°C, 3 h).

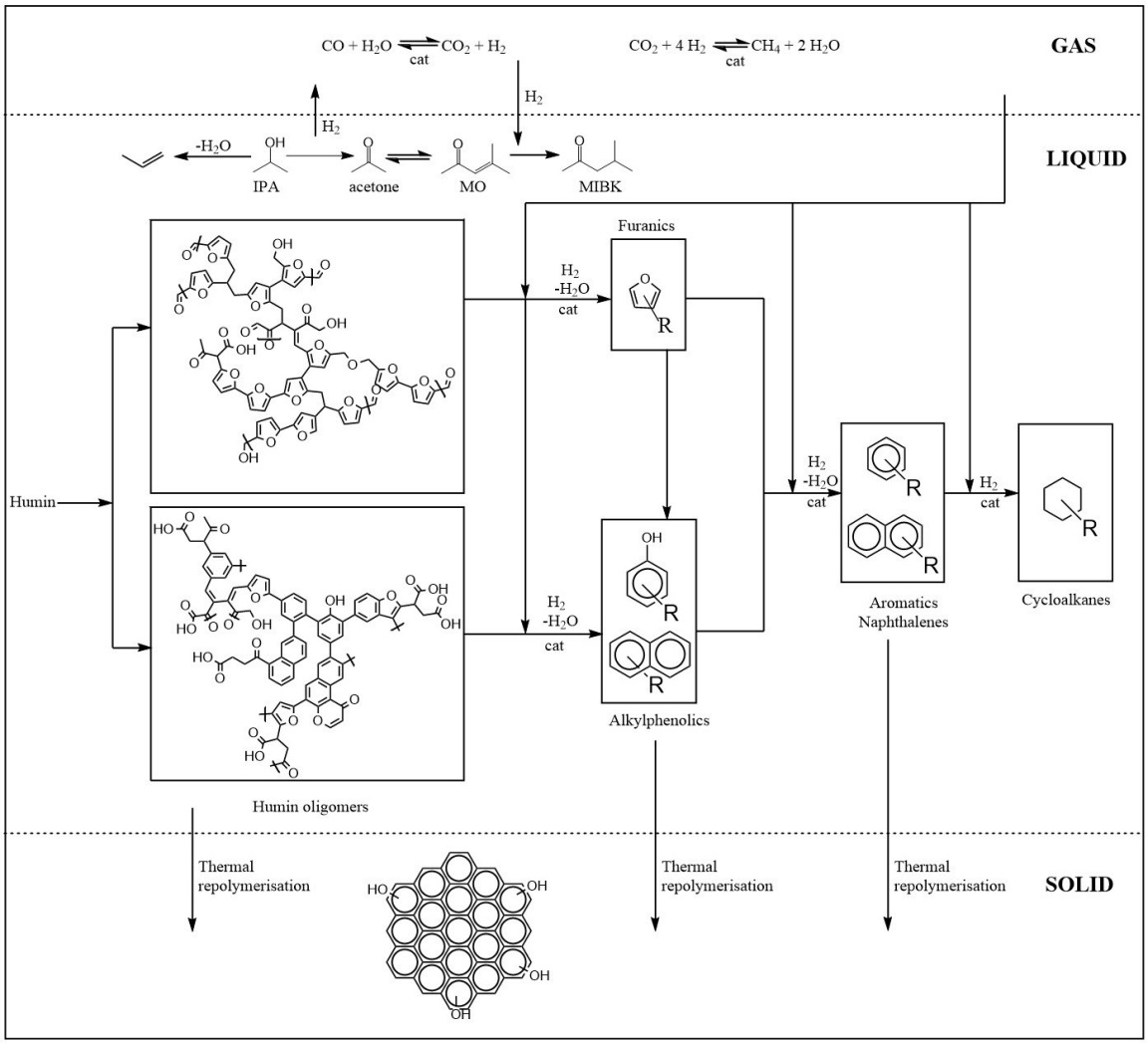
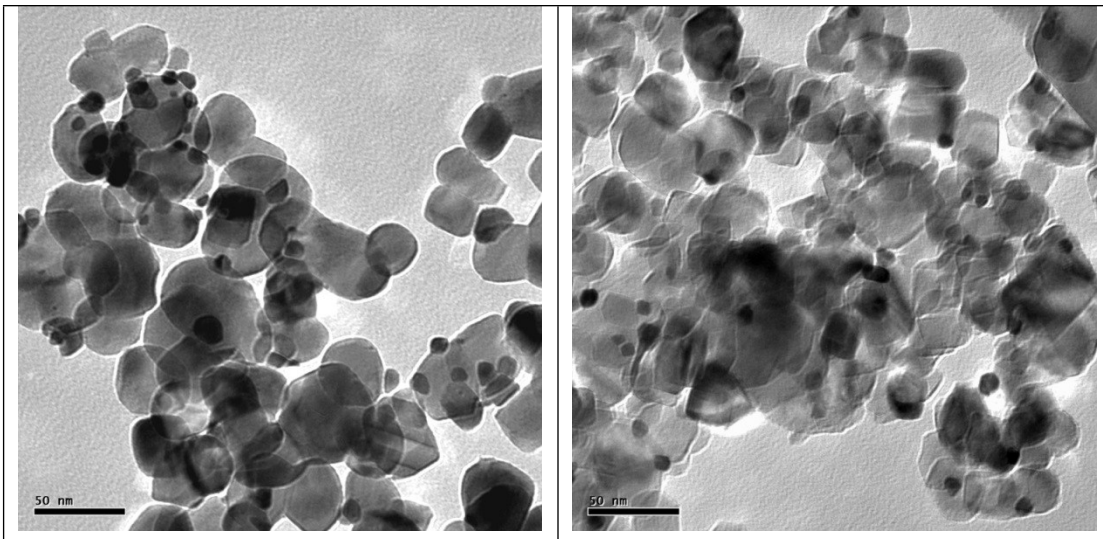


Figure S6. Possible pathway of low molecular weight chemicals formation from humin.



Pt/ZrO_2	Pt/TiO_2

Figure S7. TEM images of Pt/ZrO_2 (left) and Pt/TiO_2 (right)

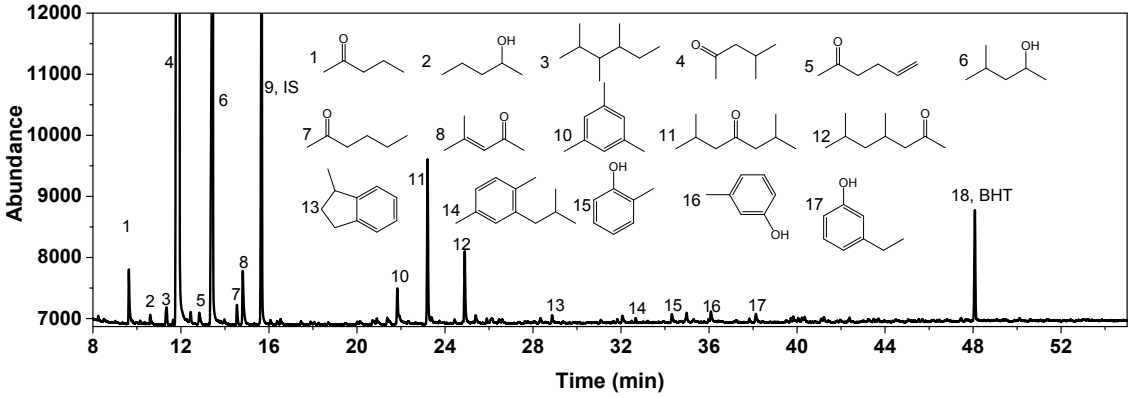


Figure S8. GC-MS/FID spectrum of a liquid product from an experiment with Pt/CeO_2 (400 °C, 3 h). The exact position of substituents on the aromatic ring for 13, 14, 15, 16. 17, could not be established unequivocally by the GC-MS database

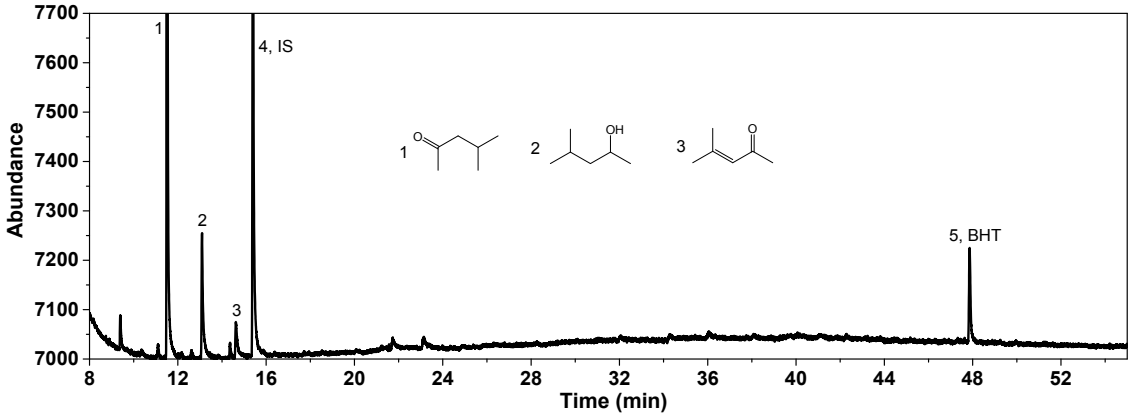


Figure S9. GC-MS/FID spectrum of a liquid product from an experiment with Pt/ ZrO_2 (400 °C, 3 h).

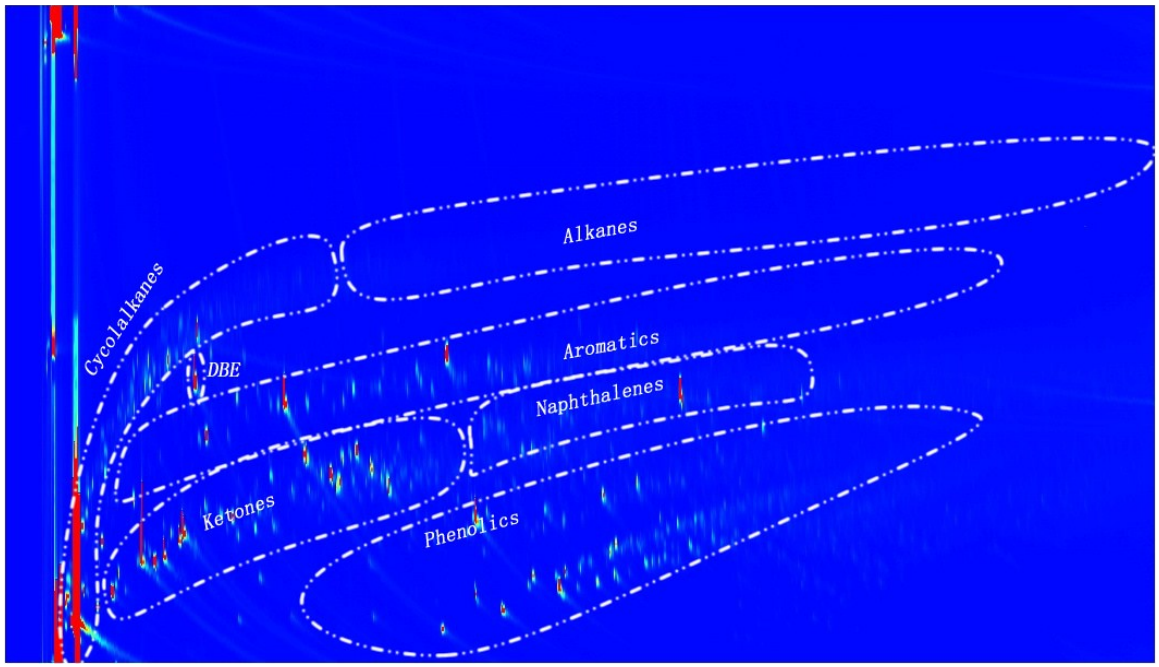


Figure S10. GCxGC chromatogram for a liquid product from an experiment with Pt/TiO_2 (400°C, 3 h).

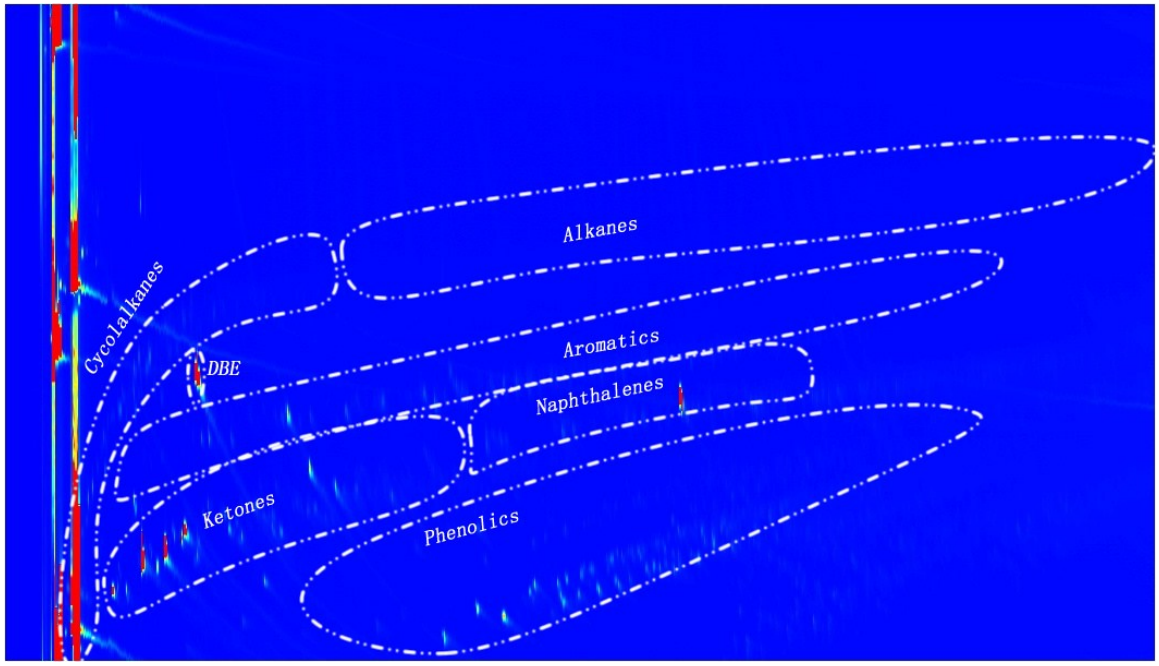


Figure S11. GCxGC chromatogram for a liquid product from an experiment with Pt/ZrO_2 (400°C, 3 h).