Aldol condensation of biomass-derived levulinic acid and furfural over acid zeolites

Jennifer Cueto¹, Valeria Korobka², Laura Faba¹, Eva Díaz¹, Salvador Ordóñez¹*

¹Catalysis, Reactors and Control Research Group (CRC), Dept. of Chemical and Environmental Engineering, University of Oviedo, Oviedo 33006, Spain

²Department of Chemical and Process Engineering, University of Strathclyde, 75 Montrose Street, Glasgow G11XJ, Scotland, UK

*e-mail: sordonez@uniovi.es, Tel: +34 985 103 437; Fax: + 34 985 103 434

Supporting Information

6 pages (S1-S6)

5 figures (Fig S1 – Fig S5)
Figure S1. Theoretical mass spectra of β-C10 (a) and δ-C10 (b) used for GC-MS analyses.
Figure S2. TPD profiles after reaction (1.8 g ZSM-5 (23) and equimolar reactant ratio) as function of temperature: 373 K (blue); 398 K (yellow); 423 K (brown), and 448 K (red). Legend: (a) 39 signal corresponds to FFL; (b) 43 signal to LA; (c) 77 signal for β-C10 and (d) 65 signal for δ-C10.
Figure S3. TPOs profiles after reaction at 398 K using different ZSM-5: 23 (yellow) and 80 (pink).
Figure S4. $\text{NH}_3$-TPD profiles of different zeolites: ZSM-5 (23) (yellow); ZSM-5 (80) (pink); MOR (20) (blue) and BEA (25) (green).
Figure S5. Temporal evolution of the different reaction compounds involved in FFL-LA aldol condensation using 1.8 g of H-MOR (20) and equimolar ratio as a function of the temperature. Legend: (a) 423 K and (b) 448 K. Symbols: (●) NaLe; (▲) FFL; (▲) β-C10; (■) δ-C10 and (*) carbon balance. Broken lines corresponds to kinetic model predictions.