

Liquid-Phase Dehydration of Glycerol to Acrolein with ZSM-5-Based Catalysts in the Presence of a Dispersing Agent

Lin Huang, Bo Wang,* Licheng Liu and Armando Borgna

Institute of Sustainability for Chemicals, Energy and Environment, Agency for Science, Technology and Research, 1 Pesek Road, Jurong Island, Singapore 627833, Singapore

1. Preparation of P-ZSM-5

P-ZSM-5 (H_3PO_4 -modified H-ZSM-5) included 2 %P-ZSM-5_280 , 10 %P-ZSM-5_280, 15 %P-ZSM-5_280 and 20 %P-ZSM-5_280. They were prepared by impregnation. In a preparative experiment, a total of 2 g of H-ZSM-5 was impregnated with a 15-85 % H_3PO_4 solution at 22 °C. After 3 h of standing, the impregnated sample was dried under vacuum at 22 °C for 2 h followed by drying at 120 °C for 12 h. Finally, the resulting sample was calcined at 500 °C in N_2 for 5 h to give P-ZSM-5.

2. Deconvolution of NH_3 -TPD Curves of Solid Acid Catalysts

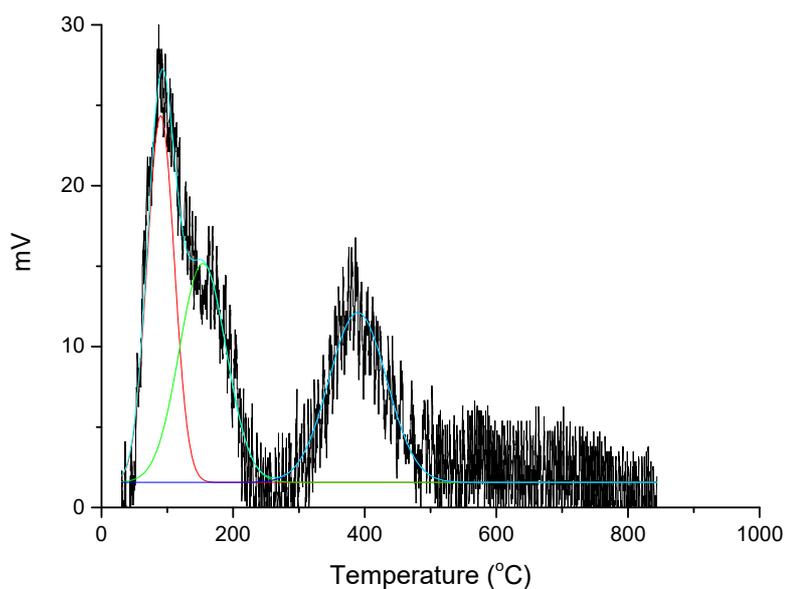


Figure S1. NH_3 -TPD of ZSM-5_280.

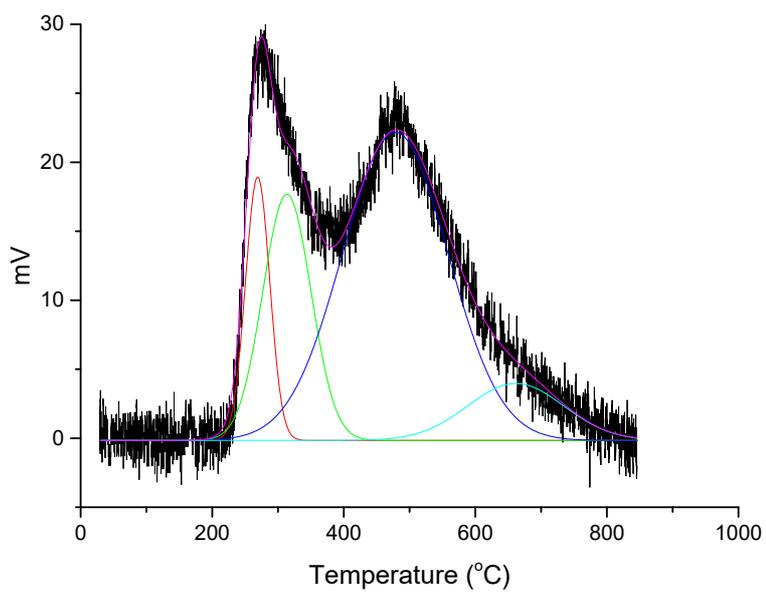
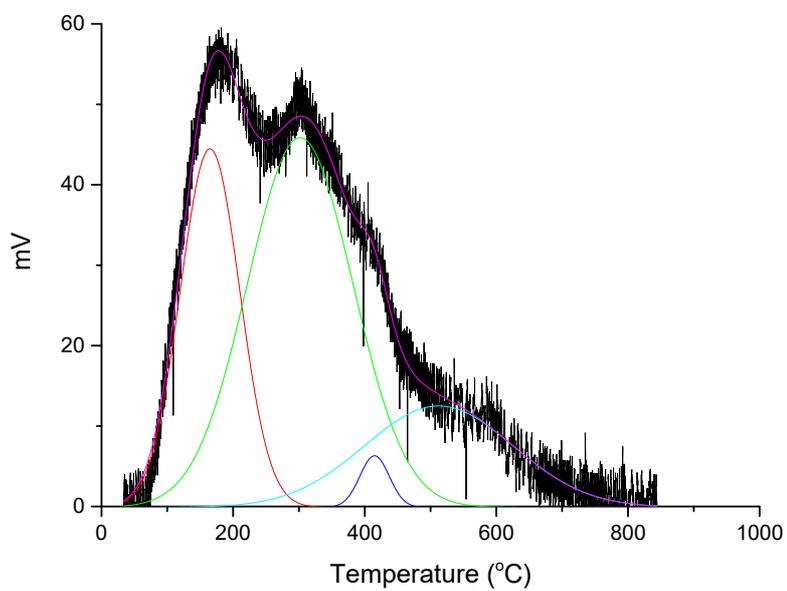


Figure S2. NH₃-TPD of ZSM-5_80.



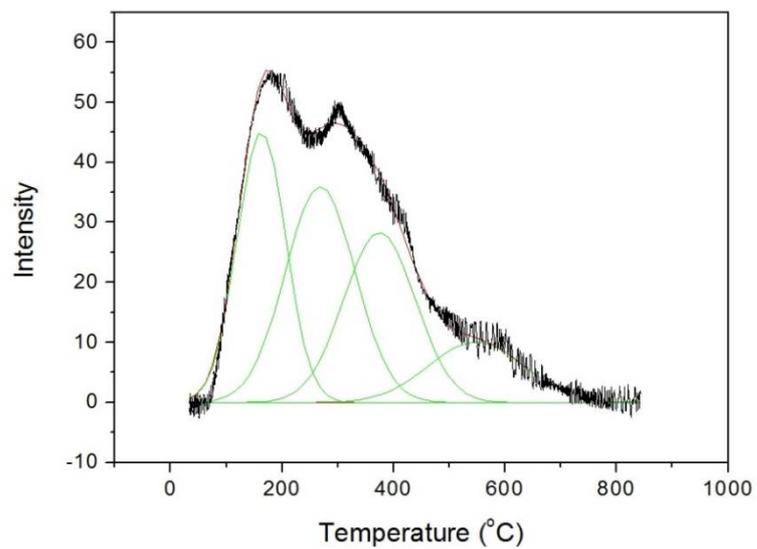
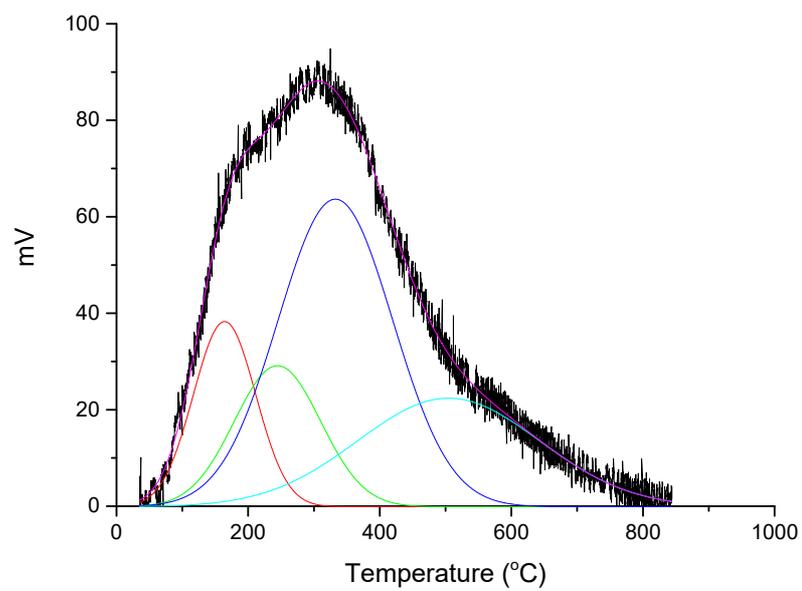


Figure S3. NH₃-TPD of 2 %P-ZSM-5_280.



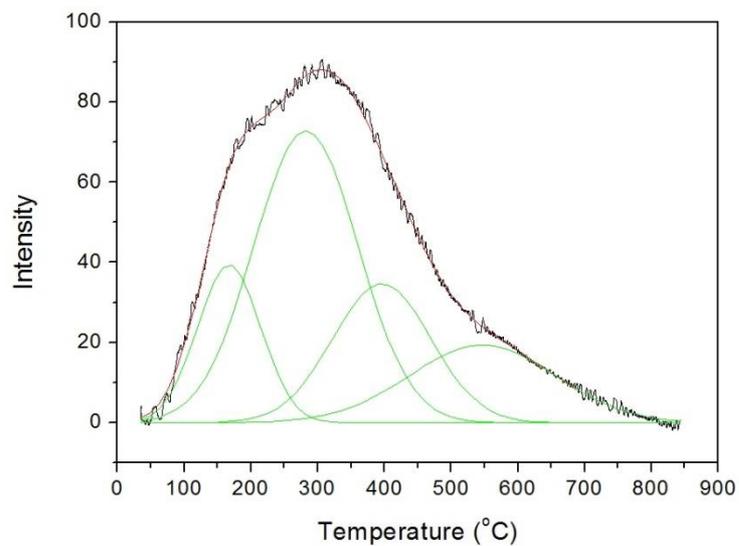
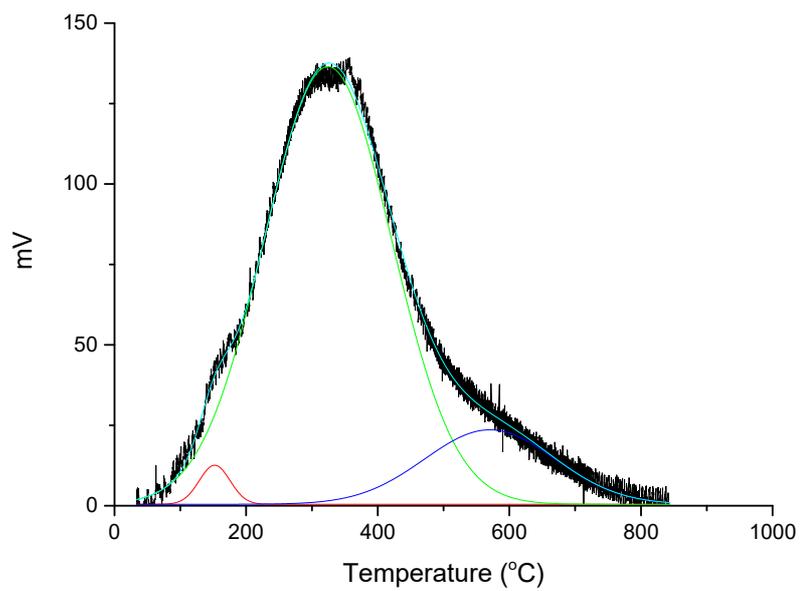


Figure S4. NH₃-TPD of 10 %P-ZSM-5_280.



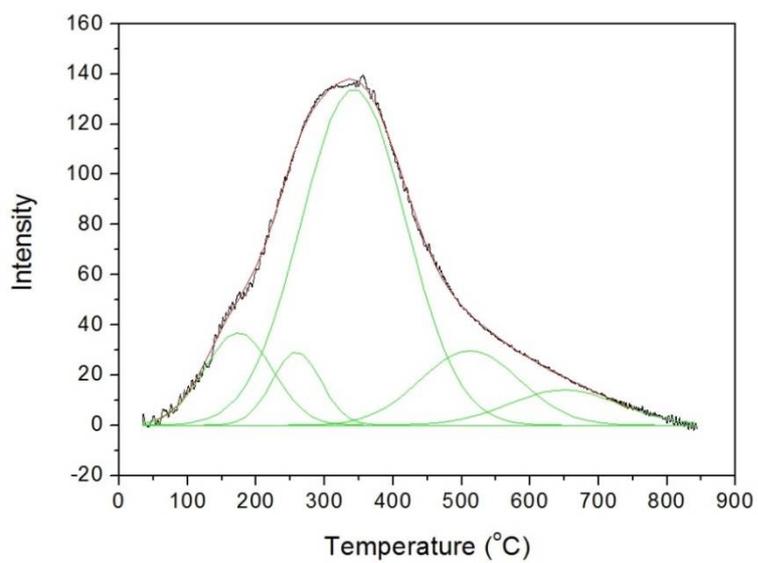
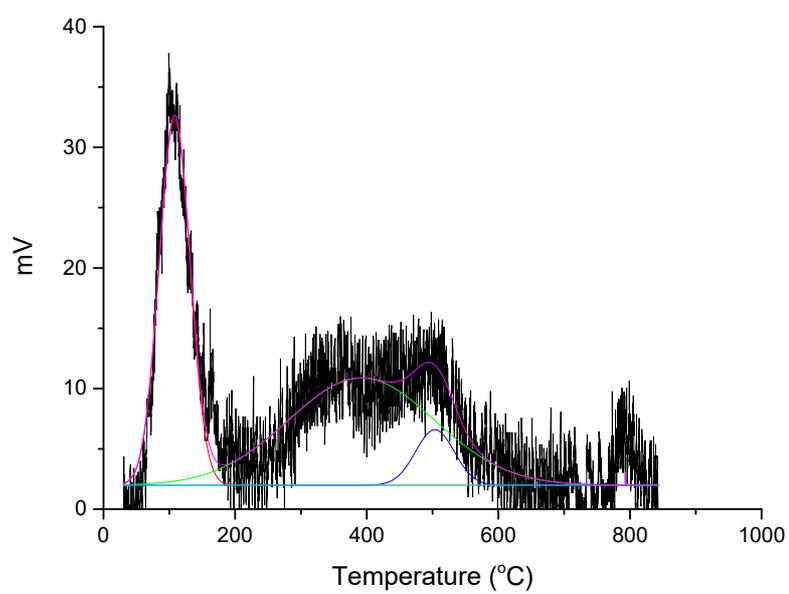


Figure S5. NH₃-TPD of 20 %P-ZSM-5_280.



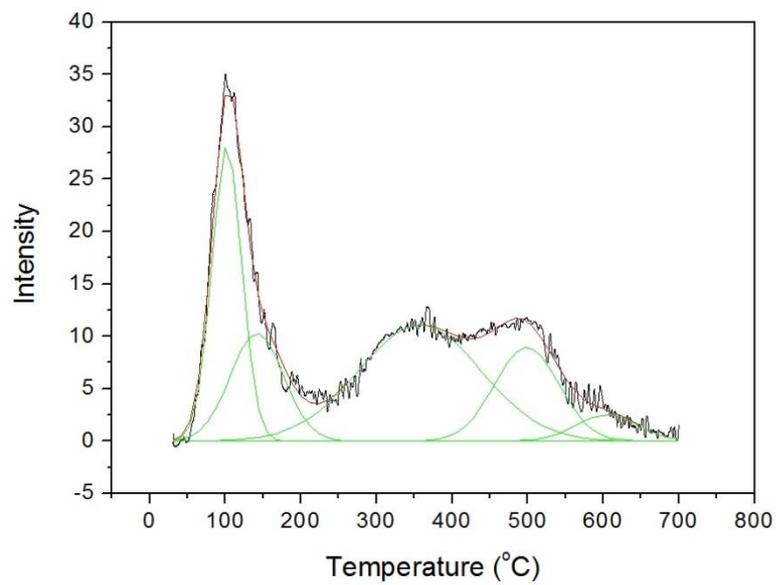
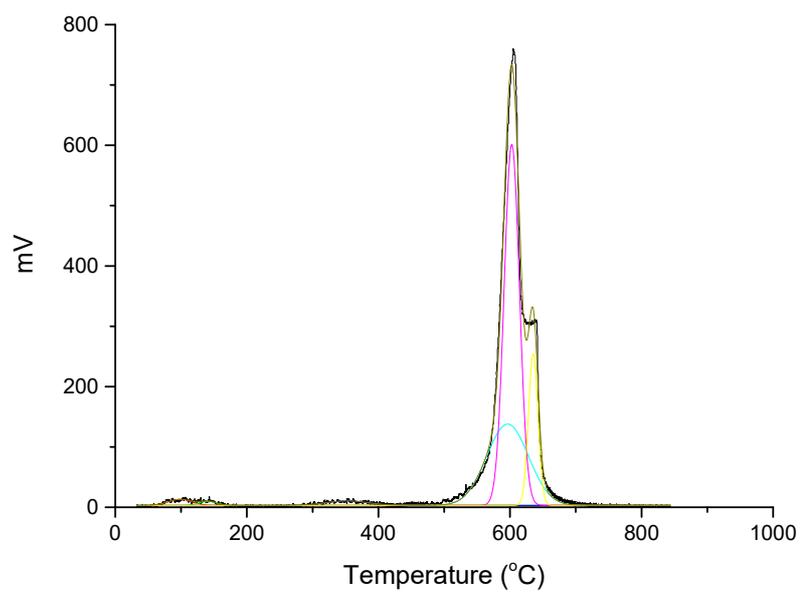


Figure S6. NH₃-TPD of CsPW.



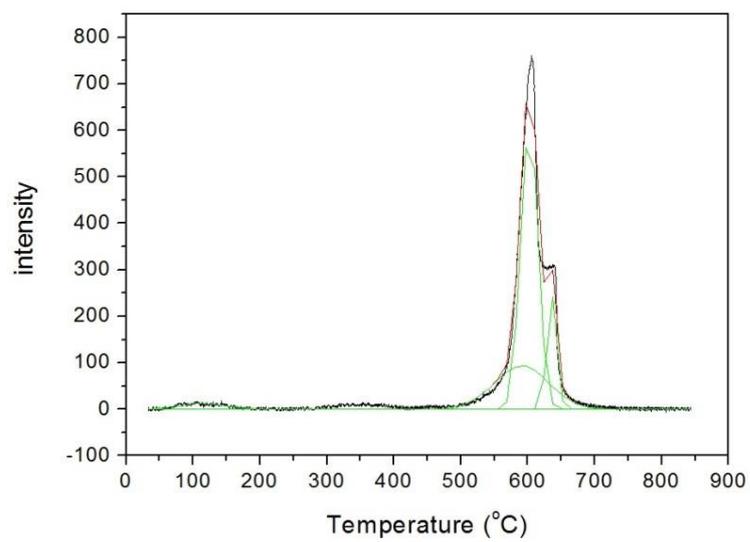


Figure S7. NH₃-TPD of HPW.