

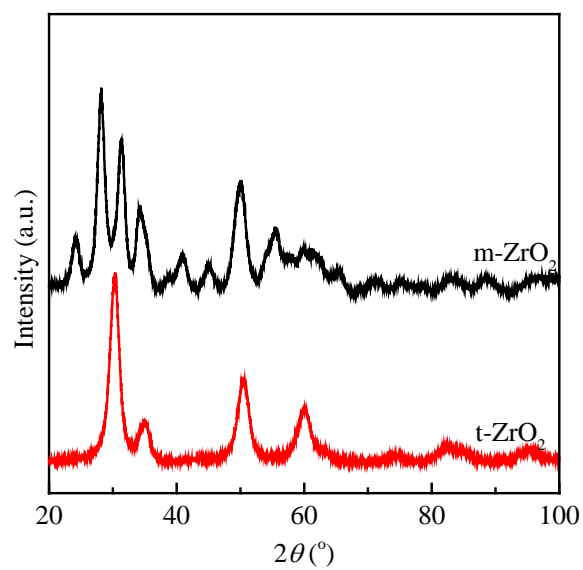
## Supporting Information

# Effect of Zirconia Polymorph on Vapor-Phase Ketonization of Propionic Acid

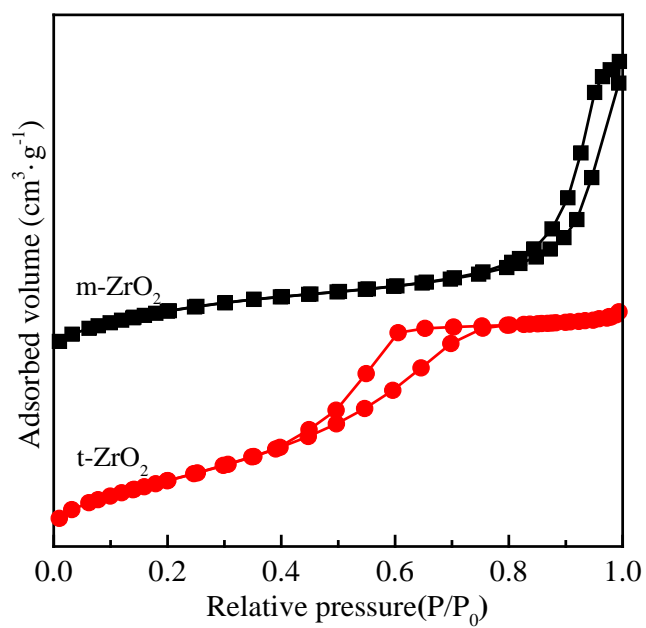
Shuang Ding \*, Jiankang Zhao and Qiang Yu

Collaborative Innovation Center of Chemical Science and Engineering, School of Chemical Engineering and Technology, Tianjin University, Tianjin 300072, China.

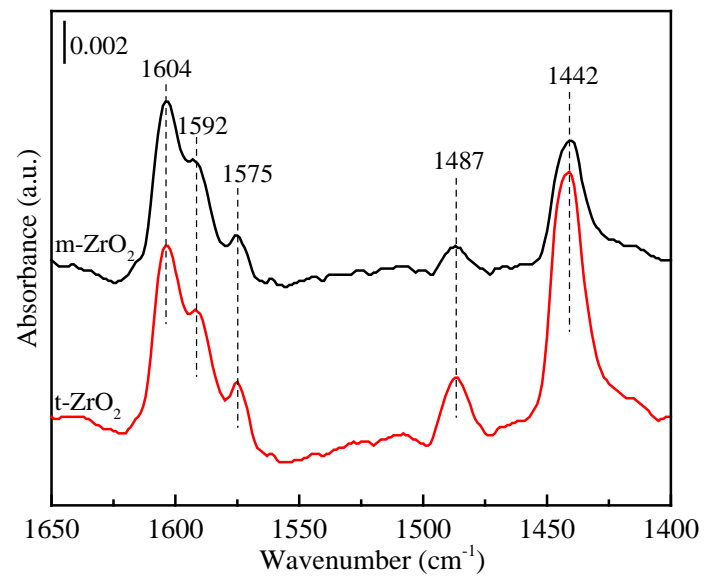
\* Correspondence: dingshuang0322@163.com (S. D.)



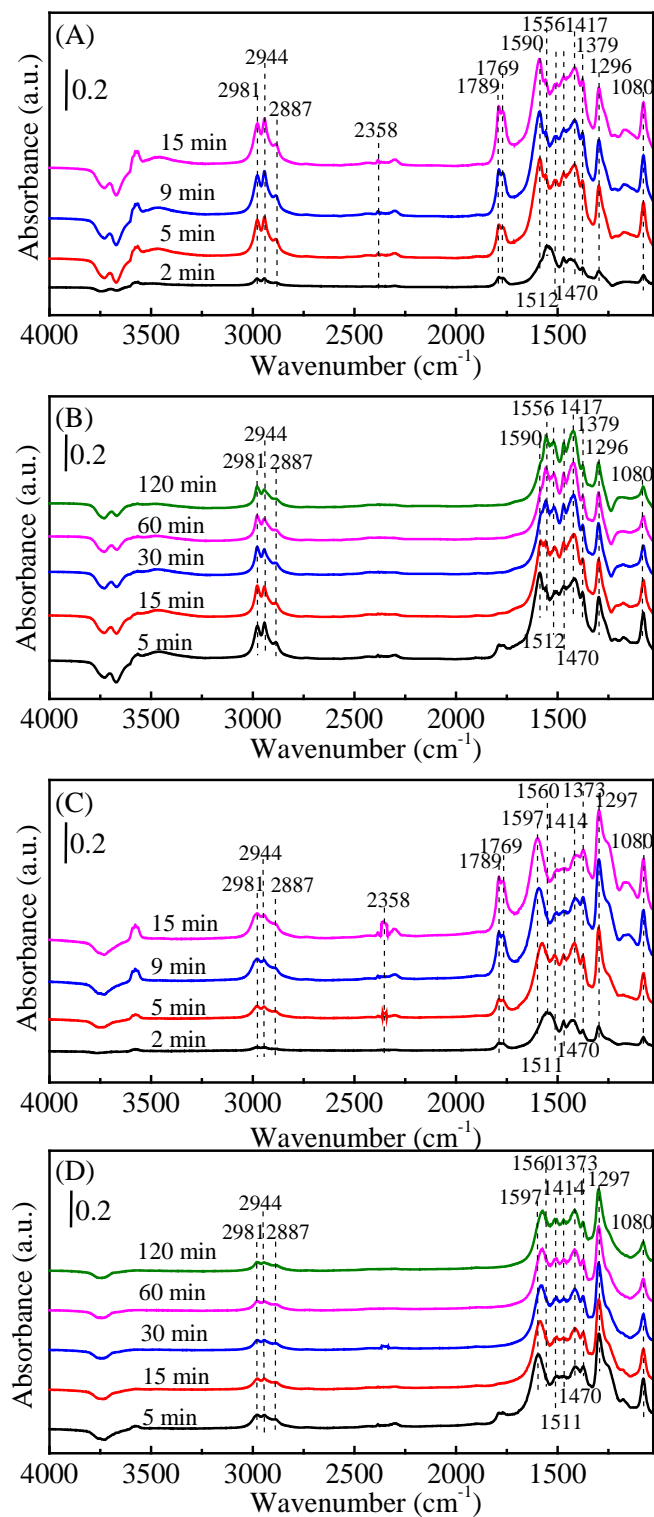
**Figure S1.** X-ray diffraction patterns of ZrO<sub>2</sub> used at 350 °C in the ketonization of propionic acid.



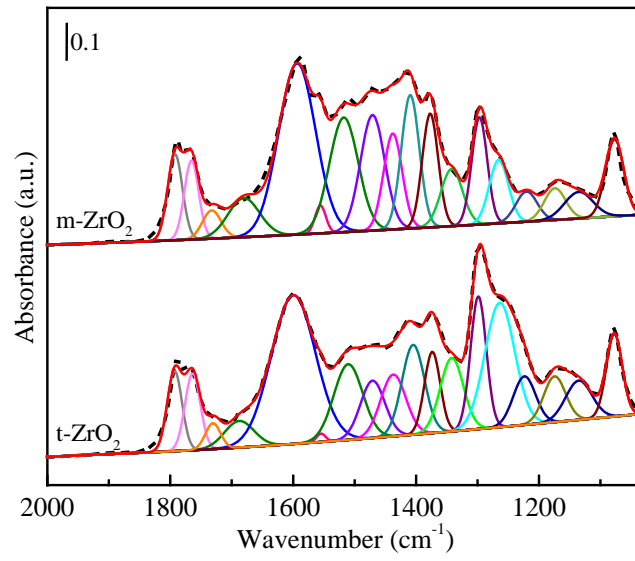
**Figure S2.** N<sub>2</sub> sorption isotherm curves of ZrO<sub>2</sub> catalysts.



**Figure S3.** DRIFT spectra of adsorbed pyridine at 30 °C on ZrO<sub>2</sub> catalysts.



**Figure S4.** DRIFT spectra of propionic acid adsorption on  $m\text{-ZrO}_2$  (A, B) and  $t\text{-ZrO}_2$  (C, D) during ketonization at  $300\text{ }^\circ\text{C}$ . A, C: under kPa propionic acid feed; B, D: after the removal of propionic acid.



**Figure S5.** Fitted DRIFT spectra of propionic acid adsorption for 15 min on ZrO<sub>2</sub> catalysts at 300 °C. Dark dash line, experimental data; solid lines, curve fittings.