

## SUPPORTING INFORMATION

### Preparation of Ru/HZSM-5 catalyst and its catalytic performance for

#### 2-pentanone hydrodeoxygenation reaction

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## 1. Analysis of different metal load on HZSM-5 by ICP

Table SI-1 ICP measurement results of metal content in different catalysts

Catalyst	Metal content/wt.%	
	(Theoretical calculation)	(Experimental measurement)
Pd/HZSM-5	2.0	1.9
Pt/HZSM-5	2.0	2.0
Ir/HZSM-5	2.0	2.0
Ru/HZSM-5	2.0	2.0
Ni/HZSM-5	5.0	5.0
Co/HZSM-5	5.0	4.9
Cu/HZSM-5	5.0	5.0

## 2. NH<sub>3</sub>-TPD analysis results of Ru/HZSM-5 catalysts with different Si/Al ratios

Table SI-2 Acid properties of Ru/HZSM-5 catalysts with different Si/Al ratio

Catalyst	NH <sub>3</sub> desorption peak at lower temperature		NH <sub>3</sub> desorption peak at medium temperature		NH <sub>3</sub> desorption peak at higher temperature		Total acid amount/ $\mu\text{mol}\cdot\text{g}^{-1}$
	Peak top temperature/ $^{\circ}\text{C}$	Weak acid amount/ $\mu\text{mol}\cdot\text{g}^{-1}$	Peak top temperature/ $^{\circ}\text{C}$	Strong acid amount/ $\mu\text{mol}\cdot\text{g}^{-1}$	Peak top temperature/ $^{\circ}\text{C}$	Strong acid amount/ $\mu\text{mol}\cdot\text{g}^{-1}$	
	Ru/HZSM-5(21)	190.9	319.2	263.9	231.6	347.1	
Ru/HZSM-5(61)	184.6	130.4	—	—	303.4	194.3	324.7
Ru/HZSM-5(130)	180.7	101.0	—	—	283.3	191.9	292.9
Ru/HZSM-5(360)	162.1	26.5	—	—	260.0	75.3	101.8
Ru/SiO <sub>2</sub>	163.7	4.1	256.8	1.8	—	—	5.9
Ru/ZrO <sub>2</sub>	131.5	15.9	277.9	48.9	—	—	64.8
Ru/TiO <sub>2</sub>	134.7	21.2	276.1	75.4	—	—	96.6

## 3. Py-IR analysis results of Ru/HZSM-5 catalysts with different Si/Al ratios

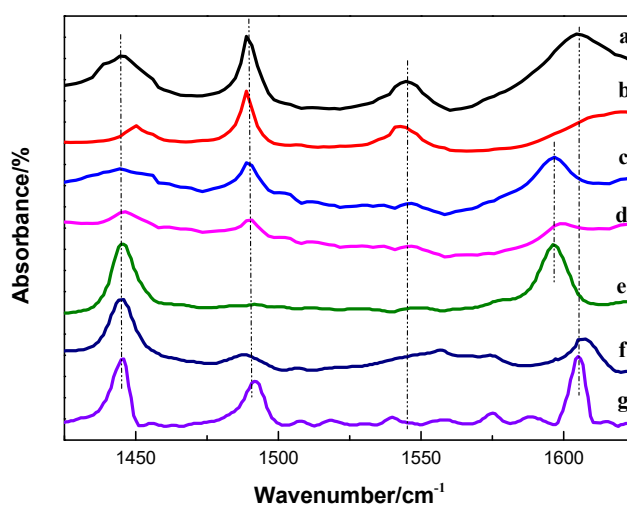


Fig. SI-1 Py-IR spectra of Ru/HZSM-5 with different Si/Al ratios  
a: HZSM-5(21); b: HZSM-5(60); c: HZSM-5(130); d: HZSM-5(360); e: SiO<sub>2</sub>; f: ZrO<sub>2</sub>; g: TiO<sub>2</sub>

#### 4. Relationship between grain size and calcination temperature

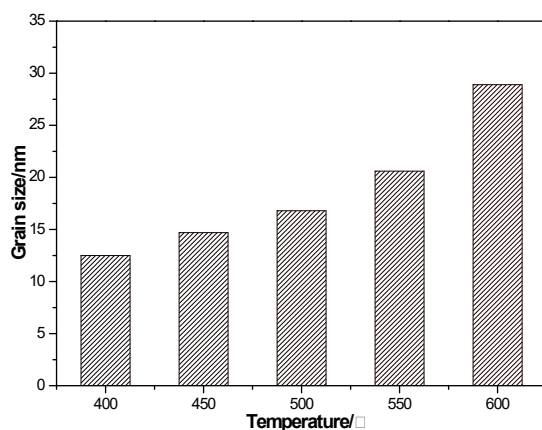


Fig. SI-2 Relationship between grain size and calcination temperature

#### 5. XRD characterization results of Ru/HZSM-5 prepared at different calcination temperatures

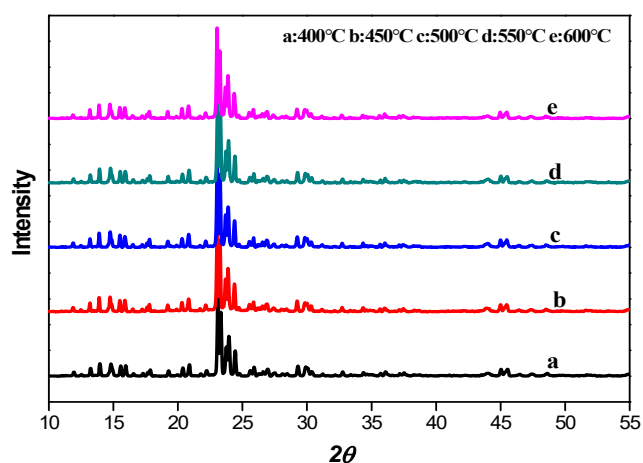


Fig. SI-3 XRD patterns of Ru/HZSM-5 prepared at different calcination temperatures

#### 6. TG-DSC analysis of the used Ru/HZSM-5 (21) catalyst

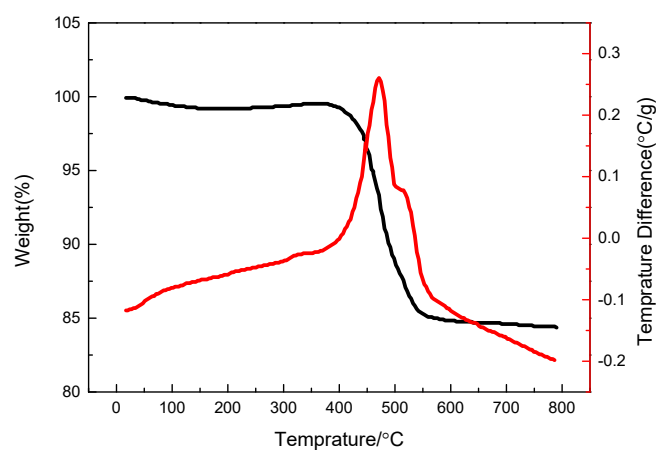


Fig. SI-4 TG-DSC analysis of the used Ru/HZSM-5 (21) catalyst