

Supporting Information

Table S1 Fraction of Qⁿ Si population determined by quantitative data of solid-state

²⁹Si MAS NMR spectra

No.	Sample name	Chemical shift range (ppm)	(Q ² +Q ³)/Q ⁿ (%)	Q ⁴ /Q ⁿ (%)
1	<i>R0.5</i>	-80.0 ~ -127.4	64	36
2	<i>R0.5S5</i>	-81.5 ~ -126.0	55	45
3	<i>R0.5S10 (or RS-160)</i>	-85.8 ~ -132.8	46	54
4	<i>RS-112</i>	-89.4 ~ -122.7	45	55
5	<i>RS-28</i>	-88.9 ~ -123.0	44	56
6	<i>R0.5S10-AT</i>	-80.0 ~ -132.4	55	45

Table S2 TG analysis results of zeolite precursors and catalysts

Sample	303~473 K (%)	473~823 K (%)	823~1073 K (%)	Total weight loss (303~1073 K)	Removal rates of PI (%)
<i>RS-28</i>	7.95	12.97	1.60	22.52	
<i>RS-28-AT</i>	9.56	5.34	1.27	16.17	46.42
<i>RS-56</i>	5.21	12.77	1.85	19.83	
<i>RS-56-AT</i>	8.79	6.86	1.64	17.29	58.82
<i>RS-112</i>	8.23	12.02	1.39	21.64	
<i>RS-112-AT</i>	9.59	4.89	1.08	15.56	59.35
<i>RS-140</i>	6.83	14.17	1.33	22.33	
<i>RS-140-AT</i>	8.87	5.48	1.24	15.59	61.32
<i>RS-160</i>	5.54	11.91	1.07	18.52	
<i>RS-160-AT</i>	9.22	4.52	1.05	14.79	62.05

Table S3 Textural properties of Fe₂O₃ supported zeolite catalysts^a

Catalysts	Total pore volume (cm ³ g ⁻¹)	BET surface area (m ² g ⁻¹)	Exter. BET surface area (m ² g ⁻¹)	Micro. BET surface area (m ² g ⁻¹)	L/B	Acid amount (mmol/g)
<i>Fe₂O₃@RS-28-C</i>	0.38	422	90	332	77.9	0.71
<i>Fe₂O₃@RS-56-C</i>	0.37	445	99	346	66.5	0.75
<i>Fe₂O₃@RS-112-C</i>	0.41	490	111	379	17.8	1.19
<i>Fe₂O₃@RS-140-C</i>	0.40	502	112	390	4.2	1.49
<i>Fe₂O₃@RS-160-C</i>	0.41	498	110	388	12.7	0.35

^a The BET surface area and pore volume are calculated based on the N₂ adsorption-desorption analysis; the acid amount is calculated based on the NH₃-TPD analysis results; the L/B ratio was calculated based on the pyridine-IR analysis results.

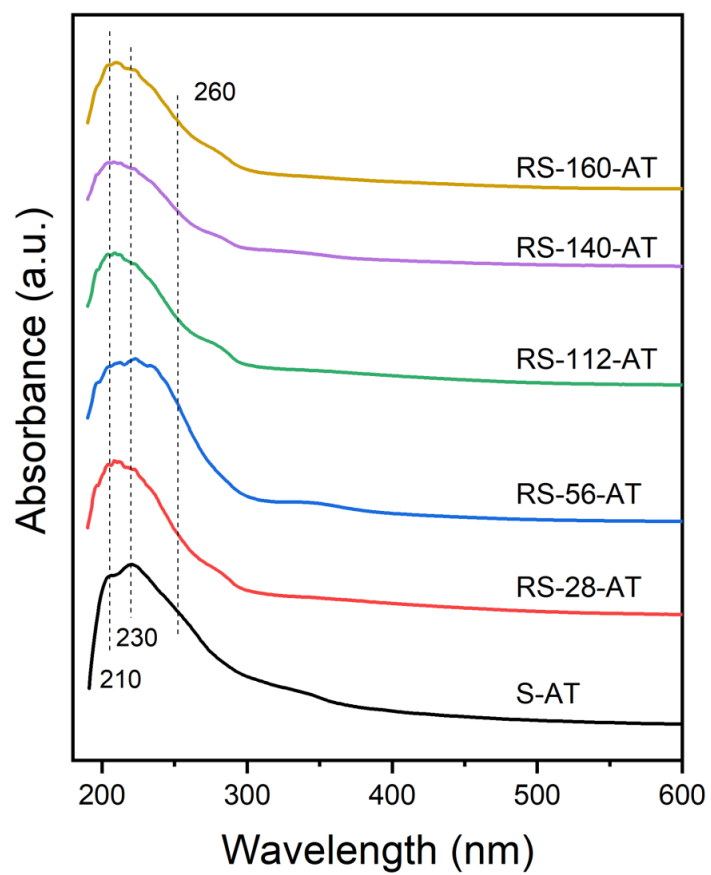


Figure S1 UV-vis spectra of *RS*-series catalysts

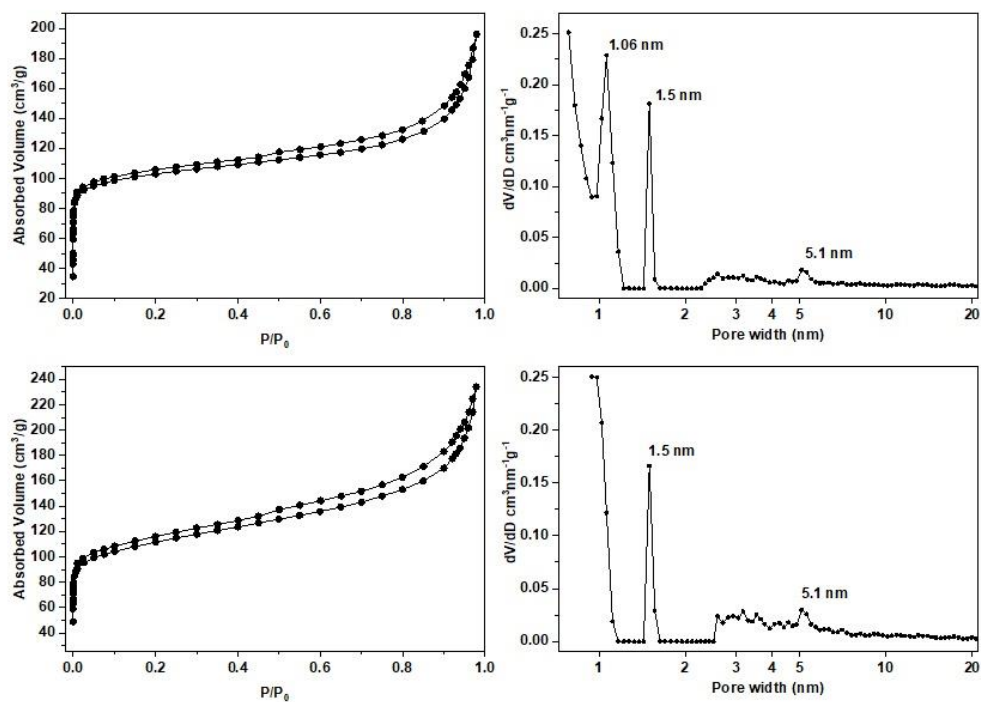


Figure S2 N₂ adsorption-desorption isotherms and pore size distributions of zeolite catalysts *RS-140-AT* (top) and *RS-160-AT* (bottom).

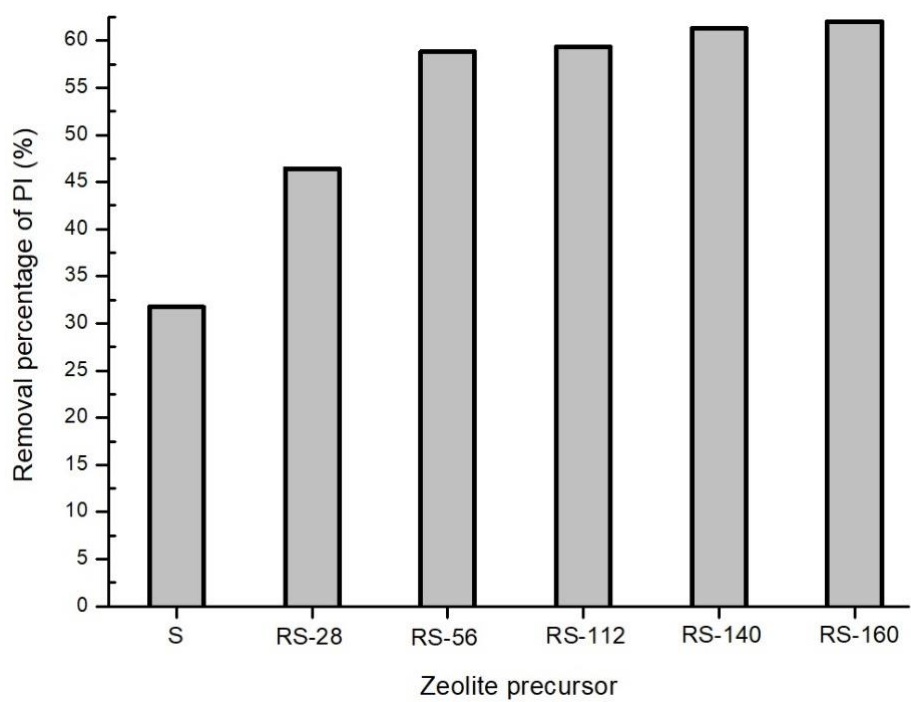


Figure S3 Removal percentage of PI in zeolite precursor by acid treatment

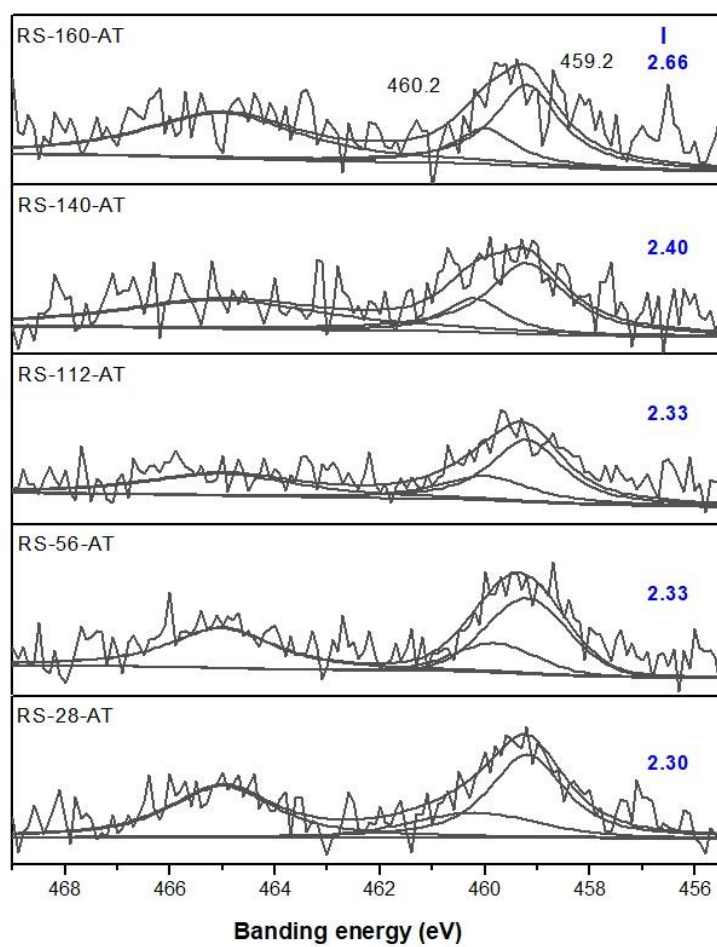


Figure S4 XPS spectra of *RS*-series catalysts

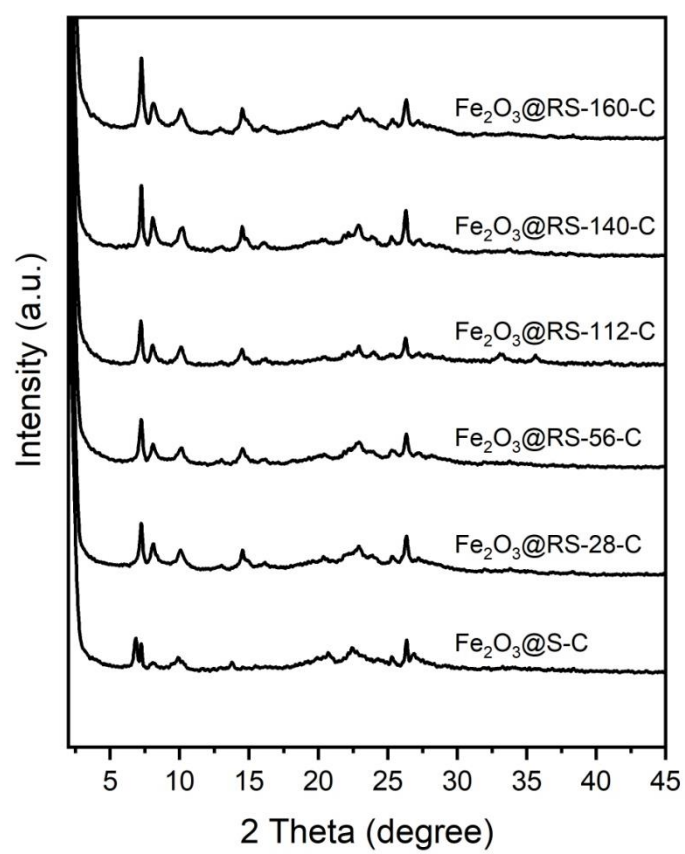


Figure S5 XRD patterns of 28%Fe₂O₃ supported zeolite catalysts

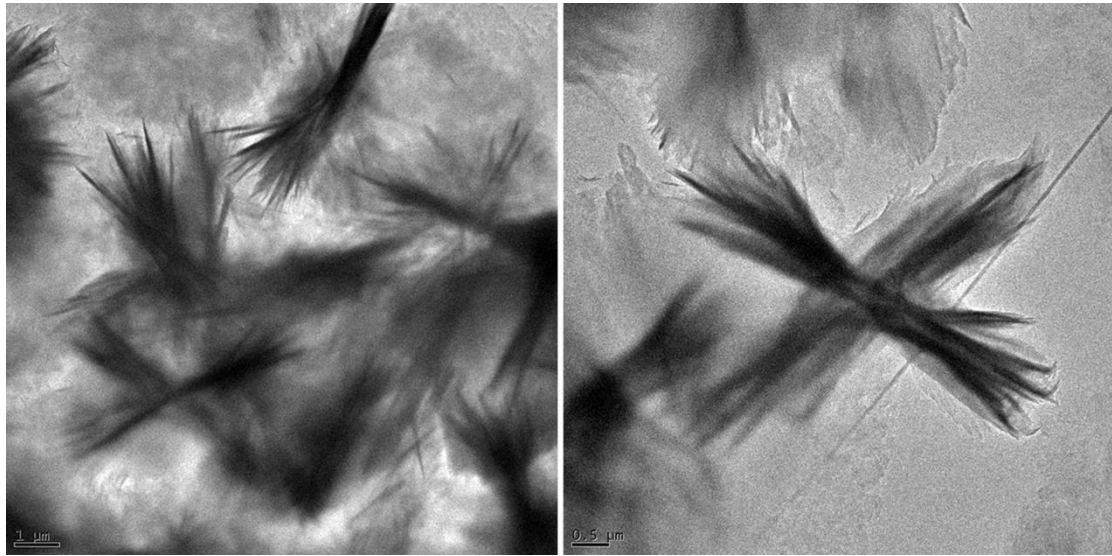


Figure S6 HRTEM images of *RS-160* zeolite precursor.

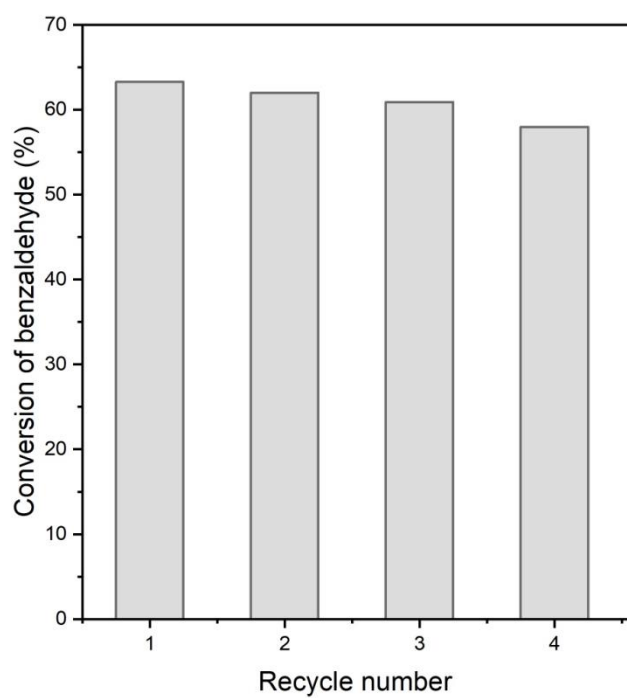


Figure S7 Recycling test in the condensation of benzaldehyde with ethylene glycol over catalyst *RS-160-AT* (Reaction conditions: catalyst, 25 mg; cyclohexane, 6 ml; benzaldehyde, 5 mmol; ethylene glycol, 7.5 mmol; Temp., 363 K; time, 5 h)