Electronic Supplementary Information

# Direct synthesis of ultrathin FER zeolite nanosheets via a dual-template approach

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## Supplementary Figure Captions

**Fig. S1** XRD patterns of C-FER (a) and SCM-37 with different SAR of 15 (b), 20 (c), 25 (d).

**Fig. S2** XRD patterns of samples crystallized using OTMAC (a), 4-DMAP (b), and both OTMAC and 4-DMAP (c).

**Fig. S3** XRD patterns of samples crystallized at different temperatures.

**Fig. S4** $NH_3$-TPD curves of the H-C-FER (a) and H-SCM-37 (b).

**Fig. S5** Py-IR spectra of H-C-FER (A) and H-SCM-37 (B).

**Fig. S6** $^{27}$Al MAS NMR spectra of the as-synthesized (A) and calcined (B) samples: C-FER (a) and SCM-37 (b).

**Table S1** Acid properties of SCM-37 and C-FER determined by $NH_3$-TPD and Py-IR.

**Table S2** T*i*PB conversion and product distributions over C-FER and SCM-37 at different reaction temperatures.

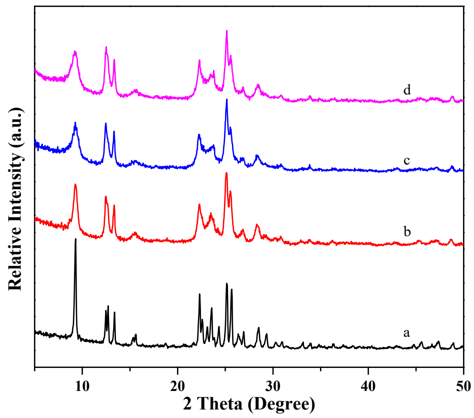


Fig. S1 XRD patterns of C-FER (a) and SCM-37 with different SAR of 15 (b), 20 (c), 25 (d).

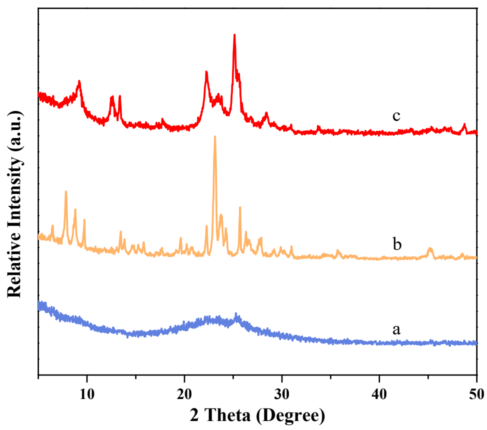


Fig. S2 XRD patterns of samples crystallized using OTMAC (a), 4-DMAP (b) and both OTMAC and 4-DMAP (c).

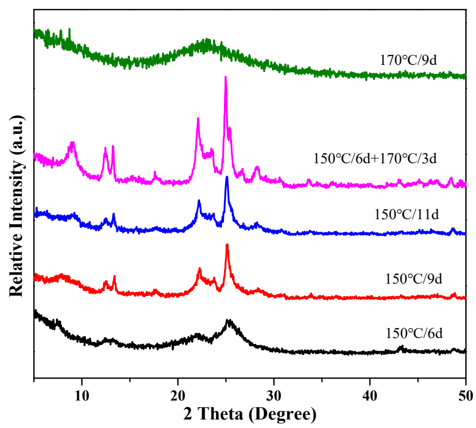


Fig. S3 XRD patterns of samples crystallized at different temperatures.

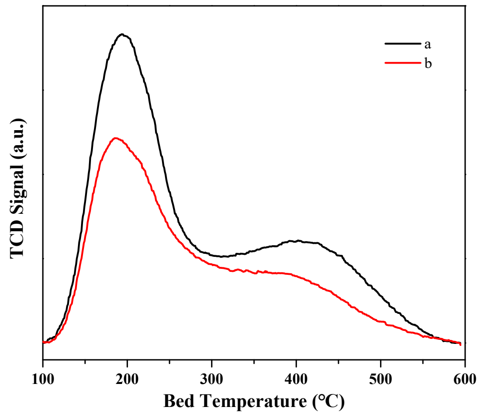


Fig. S4 $NH_3$-TPD curves of H-C-FER (a) and H-SCM-37 (b).

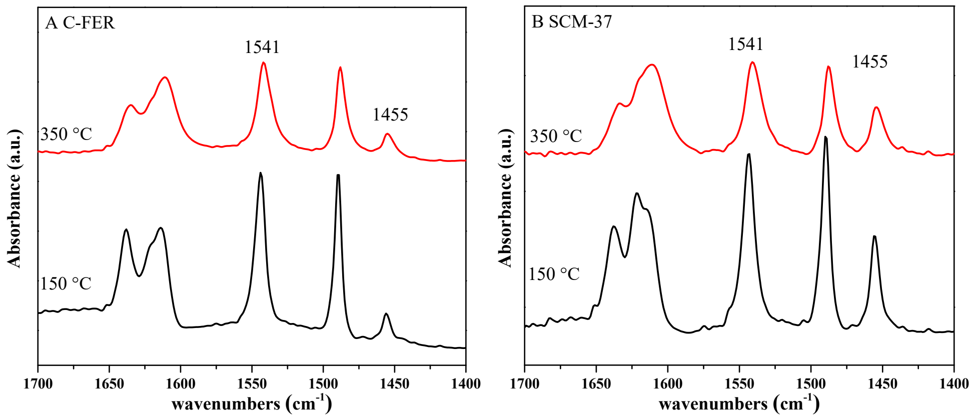


Fig. S5 Py-IR spectra of H-C-FER (A) and H-SCM-37 (B).

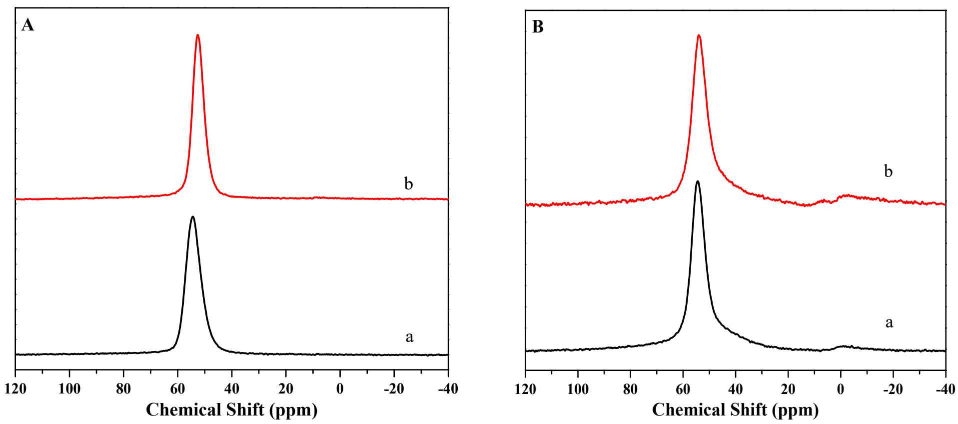


Fig. S6 $^{27}$Al MAS NMR spectra of the as-synthesized (A) and calcined (B) samples: C-FER (a) and SCM-37 (b).

Table S1 Acid properties of SCM-37 and C-FER determined by $NH_3$-TPD and Py-IR.

| Sample | Total acid concentration [a] (μmol/g) | B acid sites [b] (μmol/g) | | L acid sites [b] (μmol/g) | |
|---|---|---|---|---|---|
| | | 150 °C | 350 °C | 150 °C | 350 °C |
| C-FER | 1349 | 195 | 144 | 24 | 18 |
| SCM-37 | 955 | 147 | 88 | 35 | 22 |

[a] Measured by $NH_3$-TPD. [b] Measured by Py-IR.

Table S2 T*i*PB conversion and product distributions over C-FER and SCM-37 at different reaction temperatures.

| Temp. (°C) | T*i*PB conversion (%) | | Product selectivity (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | D*i*PBs | | *i*PB | | Bz | |
| | C-FER | SCM-37 | C-FER | SCM-37 | C-FER | SCM-37 | C-FER | SCM-37 |
| 250 | 27.4 | 74.0 | 84.1 | 76.1 | 8.6 | 21.2 | 0.2 | 0.4 |
| 275 | 30.5 | 87.3 | 86.1 | 69.9 | 8.8 | 28.7 | 0.2 | 0.7 |
| 300 | 51.7 | 96.0 | 82.1 | 48.2 | 14.7 | 47.7 | 0.7 | 3.2 |
| 325 | 71.2 | 99.3 | 75.5 | 20.5 | 22.5 | 66.0 | 0.8 | 11.9 |
| 350 | 94.6 | 99.9 | 42.4 | 5.9 | 49.5 | 58.6 | 7.6 | 33.4 |