Electronic Supplementary Information (ESI)

Aluminum-rich Beta zeolite supported platinum nanoparticles for low-temperature catalytic removal of toluene

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Table S1 Textural parameters of the as-synthesized Beta-SDS and Beta-TEA.

Sample	BET surface area (m^2/g)[a]	Micropore volume (cm^3/g)[a]	Mesopore volume (cm^3/g)[a]
Beta-SDS	434	0.19	0.02
Beta-TEA	143	0.01	0.16

[a] Determined from N_2 sorption isotherms.

Table S2 Textural parameters of the various samples.

Sample	BET surface area (m^2/g)[a]	Micropore volume (cm^3/g)[a]	Mesopore volume (cm^3/g)[a]
KBeta-SDS	309	0.13	0.02
Pt/KBeta-SDS	299	0.13	0.03
Pt/KBeta-SDS-unreduced	277	0.12	0.04
KBeta-TEA	496	0.15	0.20
Pt/KBeta-TEA	470	0.15	0.18
Pt/KBeta-TEA-unreduced	429	0.14	0.17

[a] Determined from N_2 sorption isotherms.

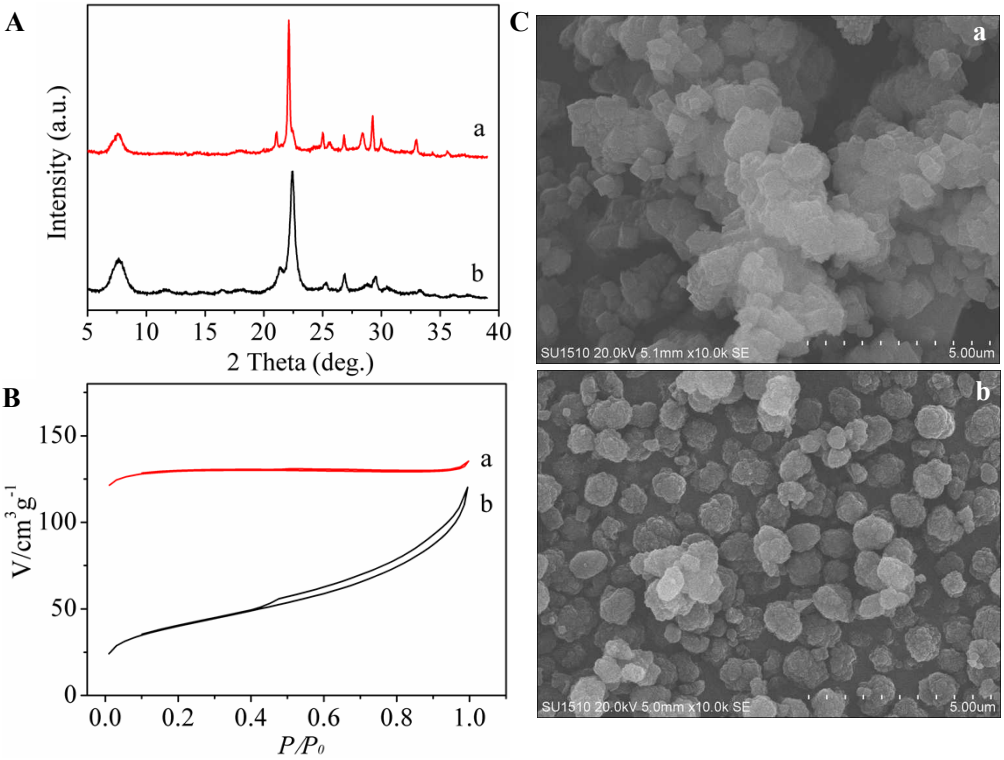

Fig. S1 (A) XRD patterns, (B) N_2 sorption isotherms, and (C) SEM images of the as-synthesized (a) Beta-SDS and (b) Beta-TEA.

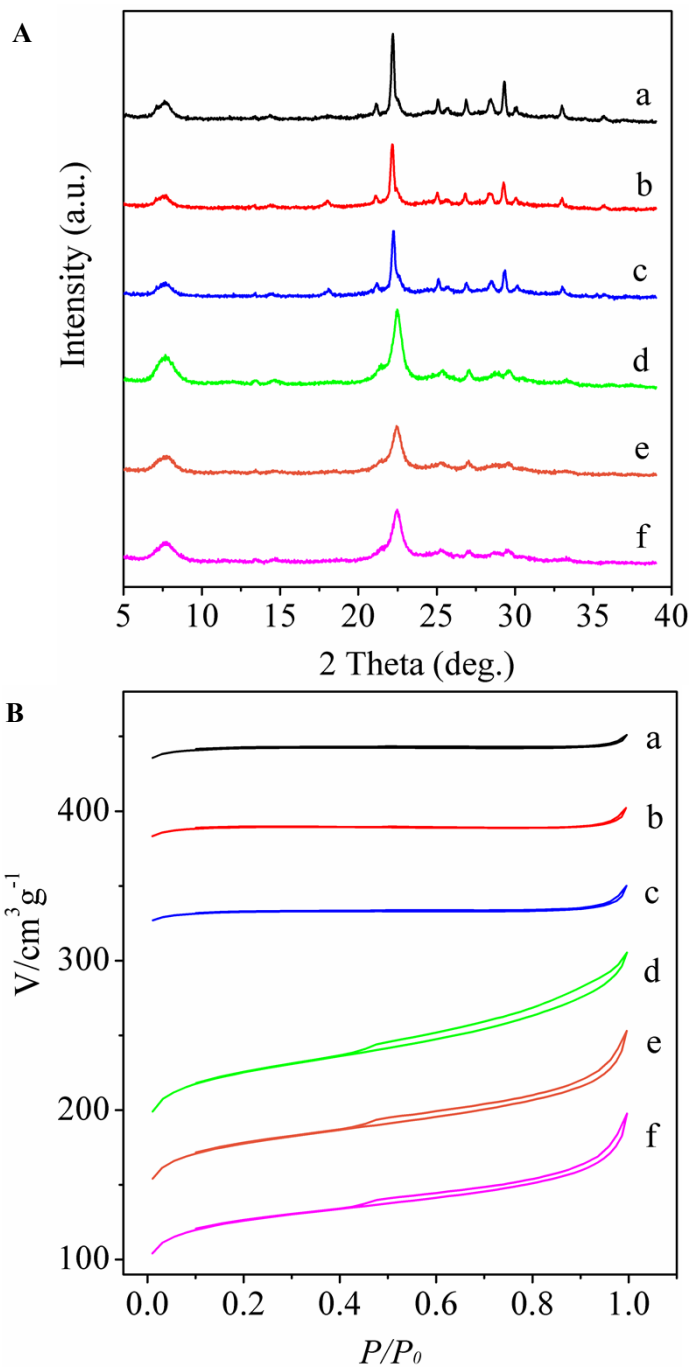

Fig. S2 (A) XRD patterns and (B) N_2 sorption isotherms of the (a) KBeta-SDS, (b) Pt/KBeta-SDS, (c) Pt/KBeta-SDS-unreduced, (d) KBeta-TEA, (e) Pt/KBeta-TEA, and (f) Pt/KBeta-TEA-unreduced. The isotherms (a), (b), (c), (d), and (e) in Fig. S2B have been off-set by 350, 300, 250, 80, and 40 cm^3/g at the beginning for clarity, respectively.

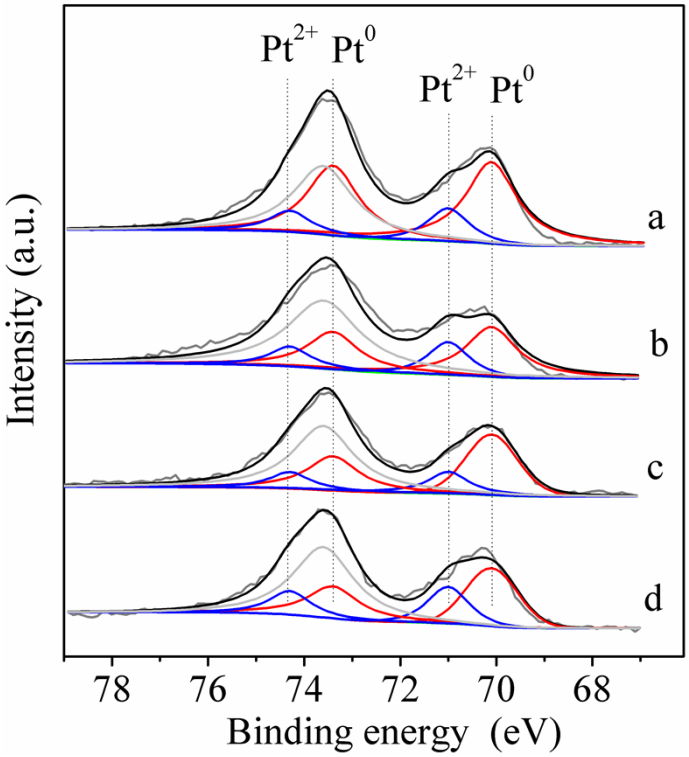

Fig. S3 Pt4f XPS spectra of the (a) Pt/KBeta-SDS, (b) Pt/KBeta-SDS-unreduced, (c) Pt/KBeta-TEA, and (d) Pt/KBeta-TEA-unreduced.

Since Al2p peak strongly overlaps with Pt4f peak in the range of 79-67 eV, it is necessary to separate Al2p peak from the spectra. In our case, Al2p is used as 73.9 eV, the $Pt4f_{7/2}$ spectra could be deconvoluted into two peaks at 70.1 together with 71.0 eV, and the $Pt4f_{5/2}$ spectra could be also deconvoluted into two peaks at 73.4 together with 74.3 eV associated with metallic Pt^0 and oxidic Pt^{2+}.[1-3]

Supplementary references

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