

A low-cost route to prepare Fe-doped ZSM-22 zeolite from the assistance of precursor solution

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Characterizations

The Si/Al and Al/Fe ratios were determined using X-ray fluorescence on a ZSX Primus II spectrometer (Rigaku, Japan). The iron content for the substituted samples was measured by inductively coupled plasma atomic emission spectrometer (ICP-AES). The X-ray diffraction (XRD) patterns were tested on a Bruker D8 ADVANCE diffractometer with Cu K α radiation ($\lambda = 1.5418 \text{ \AA}$, 40 kV, 40 mA). The morphology of the samples obtained at different crystallization processes were analyzed by scanning electron microscopy (SEM) of Quanta 250 manufactured by FEI Corporation. High-resolution Transmission Electron Microscopy (TEM) images of typical samples were obtained using a FEI Tecnai G2 F30 operated at 300 kV. The N₂ adsorption-desorption isotherms were obtained on a Micromeritics ASAP 2020 instrument at -196 °C after vacuumizing the sample at 350 °C for 8 h. UV-Raman spectra were measured on a Jobin-Yvon triple-stage spectrograph with an excitation line at 325 nm. UV-visible (UV-vis) diffuse reflectance spectra were recorded on a Cary 200 spectrometer using BaSO₄ as the reference. The contents of the C, N, H were determined by Chemical Analysis.

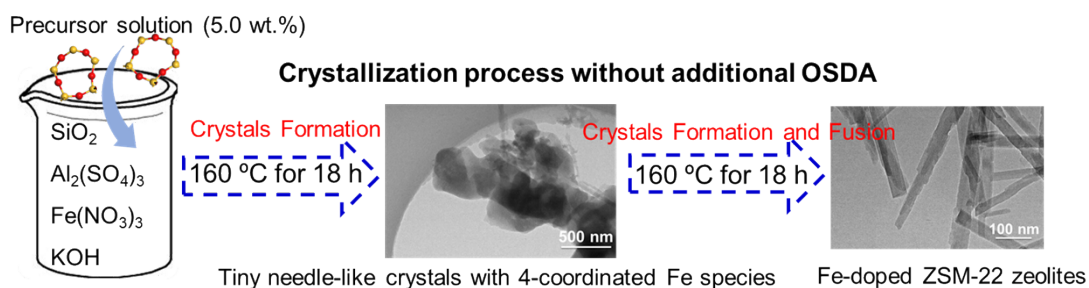


Fig. S1 Schematic diagram of growth mechanism of the Fe-doped ZSM-22 zeolites

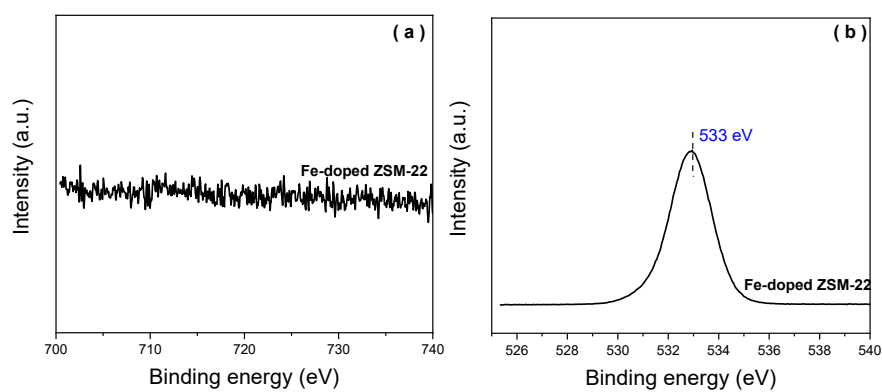


Fig. S2 XPS spectra of Fe2p (a) and O1s (c) for the Fe-doped ZSM-22 zeolite

Table S1 Unit cell parameters and volume of Fe-free and Fe-doped ZSM-22 zeolites

Samples	Unit cell parameters (Å)			Unit Volume (Å ³)
Fe-free ZSM-22	13.85	17.41	5.03	1212.88
Fe-doped ZSM-22	13.89	17.48	5.07	1230.98