Supporting Materials

Table S1 Structural parameters for $FeTiO_x$ and $FeCe_aTiO_x$ catalysts

Samples	**Specific surface area (m^2/g)**	**Pore volume (cm^3/g)**
$FeTiO_x$	119.8	0.21
$FeCe_{0.1}TiO_x$	146.4	0.22
$FeCe_{0.2}TiO_x$	175.4	0.21
$FeCe_{0.6}TiO_x$	91.8	0.10
$FeCeTiO_x$	35.9	0.08
$FeCe_{1.6}TiO_x$	62.1	0.08

Table S2 Semi-quantitative analysis of surface atomic concentration (% in molar ratio) over $FeCe_{0.2}TiO_x$, $FeTiO_x$ catalysts and Fe_2O_3, CeO_2 reference samples derived from XPS data

Samples	**Fe (%)**	**Ce (%)**	**Ti (%)**	**O (%)**	**$Ce^{3+}/(Ce^{3+} + Ce^{4+})$ (%)**	**$O_\alpha/(O_\beta + O_\alpha)$ (%)**
$FeCe_{0.2}TiO_x$	44.4	1.4	2.3	51.9	20.0	42.8
$FeTiO_x$	45.0	–	2.7	52.3	–	38.5
Fe_2O_3	49.0	–	–	51.0	–	34.1
CeO_2	–	35.7	–	64.3	19.8	29.0

Table S3 Peak deconvolution results of the H_2-TPR profiles for Fe_2O_3, $FeTiO_x$ and $FeCe_{0.2}TiO_x$

Samples	**H_2 consumption (mmol H_2/g) [a)]**	**Area ratio (%) [b)]**		
		Black	**Red**	**Blue**
Fe_2O_3	18.9	12.8 (298+323+338)	21.2 (432+504)	66.0 (560+626+697+757)
$FeTiO_x$	9.4	18.1 (293+305+319)	16.0 (431)	65.9 (513+585+743+825+865)
$FeCe_{0.2}TiO_x$	7.5	25.3 (304+315)	10.4 (438)	64.3 (511+598+694+815+885)

Notes: a) The calculated H_2 consumption amount and area ratios of sub-bands derived from the deconvoluted H_2-TPR profiles. b) The values in the parentheses represented the temperature positions of H_2 consumption peaks

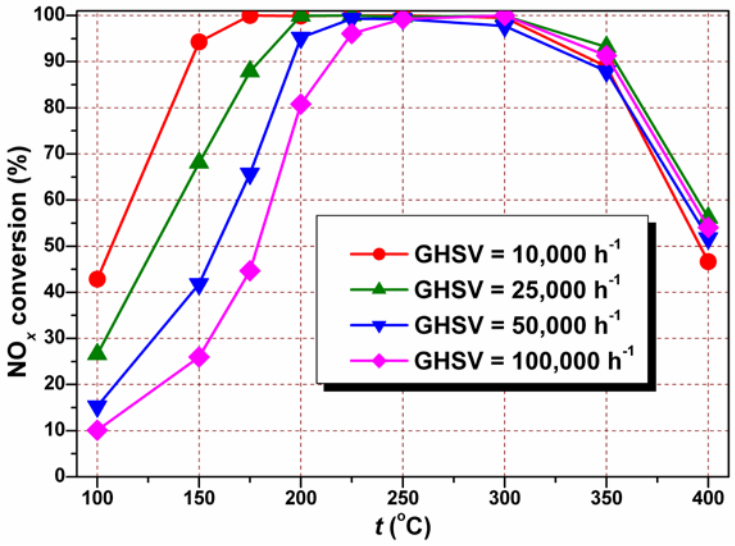

Fig. S1 The influences of GHSV on the NO_x conversion over $FeCe_{0.2}TiO_x$ catalyst

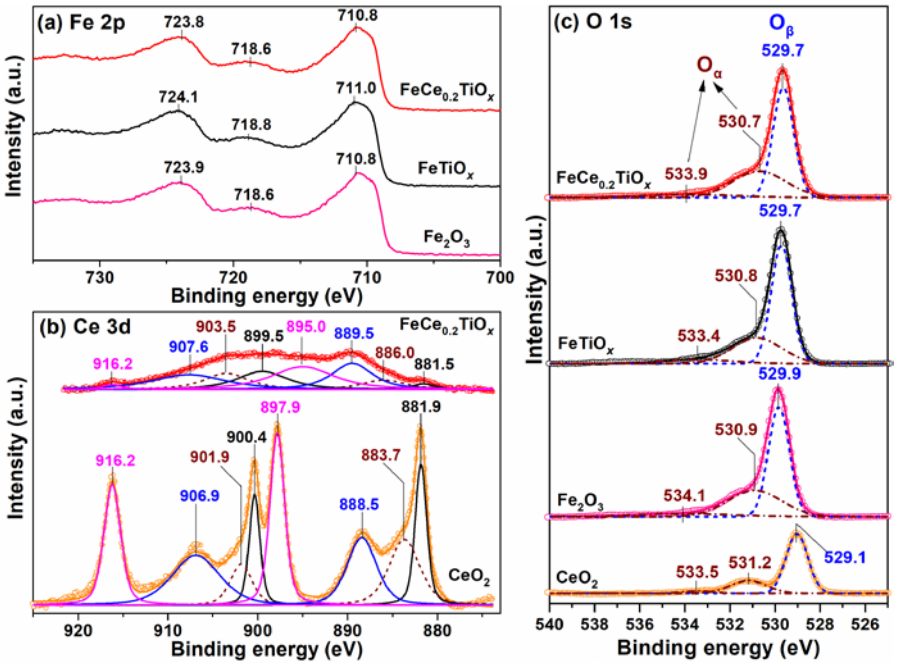

Fig. S2 XPS results of (a) Fe 2p, (b) Ce 3d, and (c) O 1s in $FeTiO_x$, $FeCe_aTiO_x$ catalysts together with Fe_2O_3 and CeO_2 reference samples

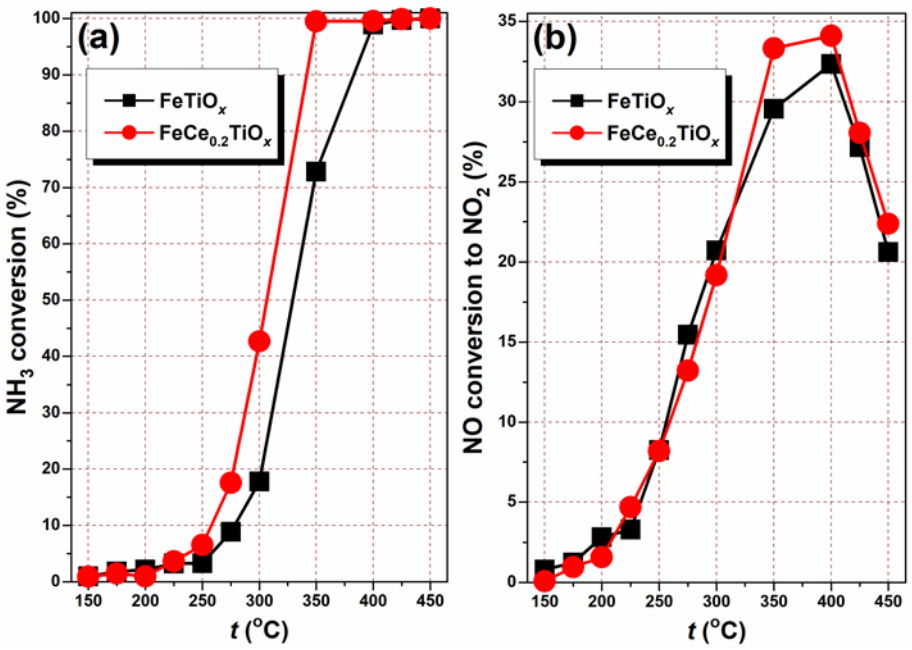

Fig. S3 (a) NH_3 conversion and (b) NO conversion to NO_2 as a function of the reaction temperature in NH_3 oxidation reaction and NO oxidation reaction over $FeTiO_x$ and $FeCe_{0.2}TiO_x$ catalysts

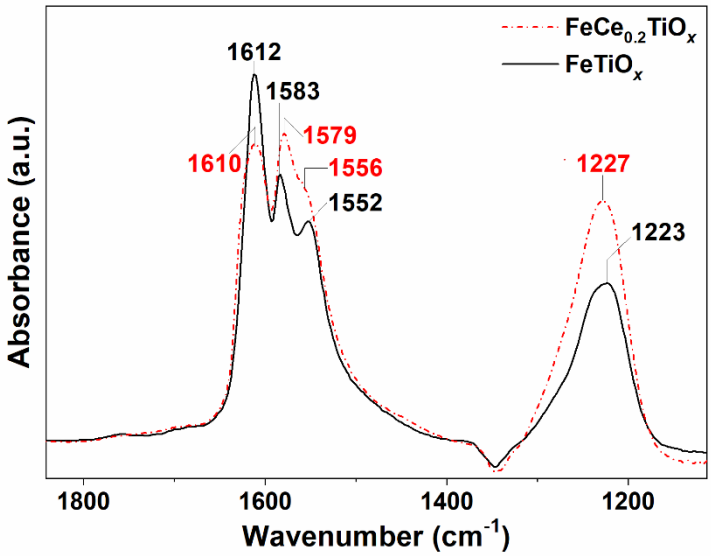

Fig. S4 *In situ* DRIFTS of NO + O_2 adsorption on $FeTiO_x$ and $FeCe_{0.2}TiO_x$ at 150°C collected in N_2 flow