Supporting Information

Low-temperature synthesis of NH_3 *via* an alternate gas-switching NO_x storage-reduction process using a BaO/Pt@mTiO_2 nanocomposite catalyst

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Table S1 The amount of stored NO_x and resultant nitrogen compounds during the 1st gas-switching operation of the inlet gas between 1000 ppm NO with 10% O_2 and 1% H_2 at temperatures ranging from 300 °C down to 175 °C

temp. (°C)	Storage (mmol g^{-1})	Reduction (mmol g^{-1})		
	NO_x ($NO+NO_2$)	NH_3	N_2O	N_2
175	0.15	0.14	0.00	0.01
200	0.21	0.15	0.01	0.02
250	0.26	0.16	0.01	0.04
300	0.18	0.03	0.01	0.06

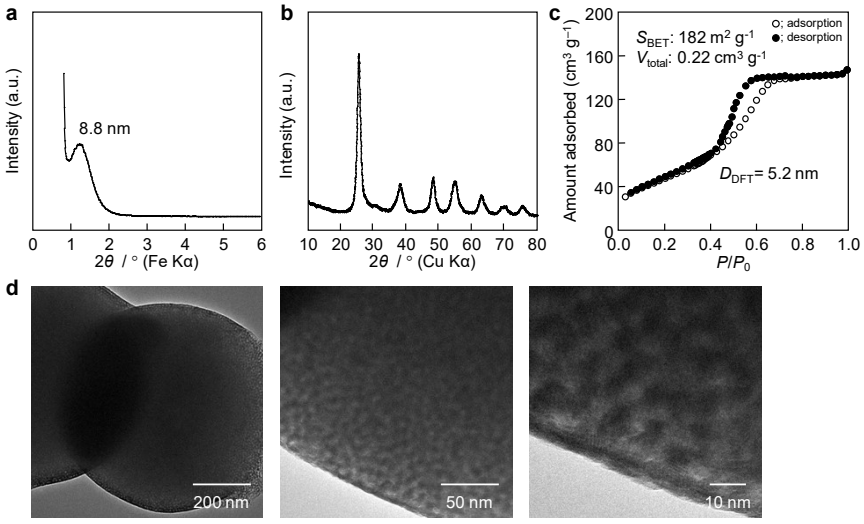

Fig. S1 Low- and wide-angle XRD patterns, N_2 adsorption-desorption isotherm and TEM images of (a, b, c, d) mTiO_2 prepared through an aerosol-assisted EISA process in the presence of Pluronic F127.

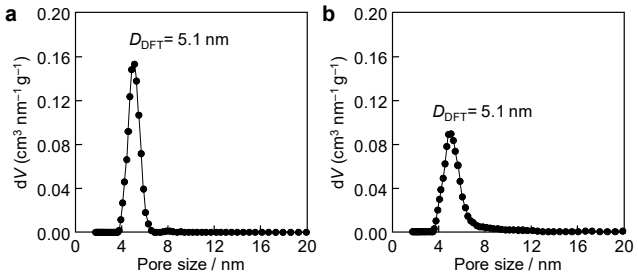

Fig. S2 Pore size distribution curves of (a) Pt@mTiO$_2$ and (b) BaO/Pt@mTiO$_2$.

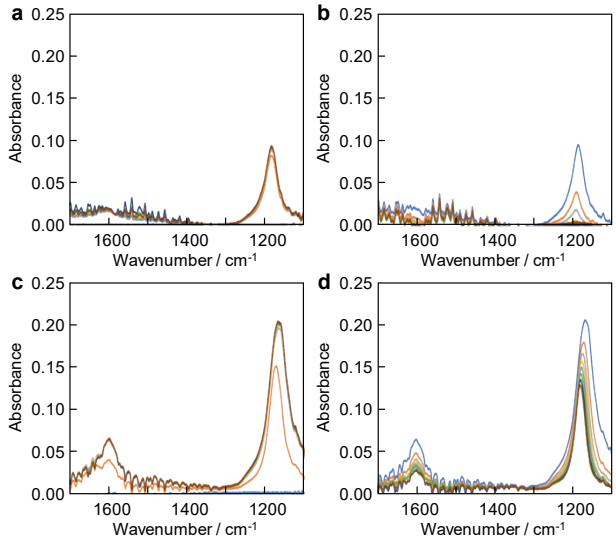

Fig. S3 *In situ* FT-IR measurements at every 4 min by using BaO/Pt@mTiO$_2$ during the gas-switching operation of the inlet gas between 500 ppm NH$_3$ for 30 min and N$_2$ for 30 min at (a, b) 300 °C and (c, d) 175 °C.

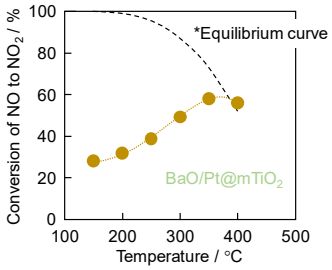

Fig. S4 The steady-state oxidation of NO in a flow of 1000 ppm NO with 10% O$_2$ for 30 min by using BaO/Pt@mTiO$_2$ at different temperatures.

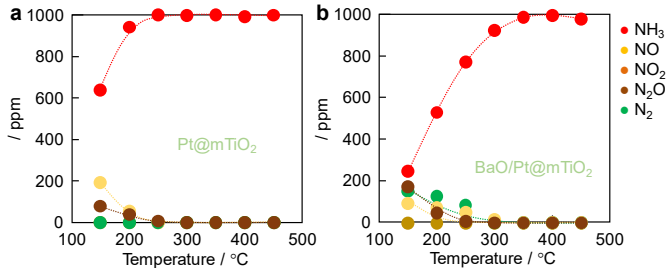

Fig. S5 Direct catalytic reduction of NO in a flow of 1000 ppm NO with 1% H_2 by using (a) Pt@mTiO_2 and (b) BaO/Pt@mTiO_2 at different temperatures.

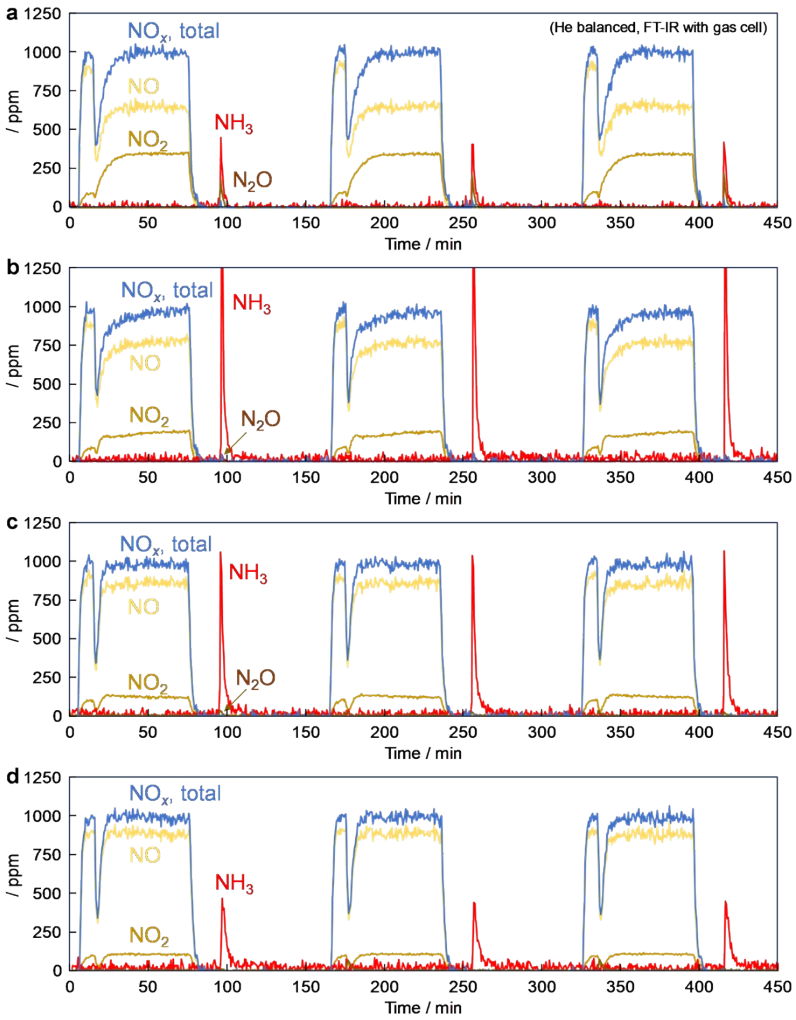

Fig. S6 Time-course plots of nitrogen compounds (e.g., NO, NO_2, N_2O and NH_3) during the alternate gas-switching operation of the inlet gas between 1000 ppm NO with 10% O_2 and 5% H_2 at (a) 300 °C, (b) 250 °C (c) 200 °C and down to (d) 175 °C.

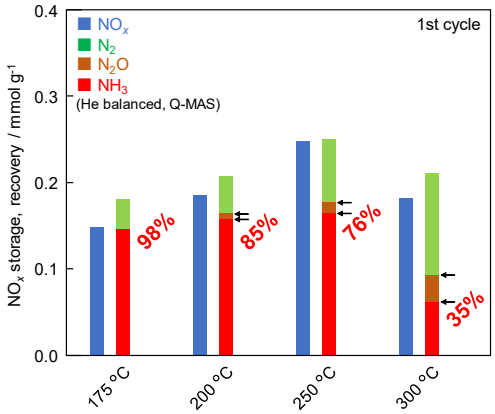

Fig. S7 A summary of the amount of stored NO_x and resultant nitrogen compounds with the selectivity to NH_3 during the 1st gas-switching operation of the inlet gas between 1000 ppm NO with 10% O_2 and 5% H_2 at temperatures ranging from 300 °C down to 175 °C.