Supporting information

Fabrication of MnO_x-CeO_2 based catalytic filters and their application in low temperature selective catalytic reduction of NO with NH_3

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Figure S1. A digital photo of a piece of mullite fibrous tube

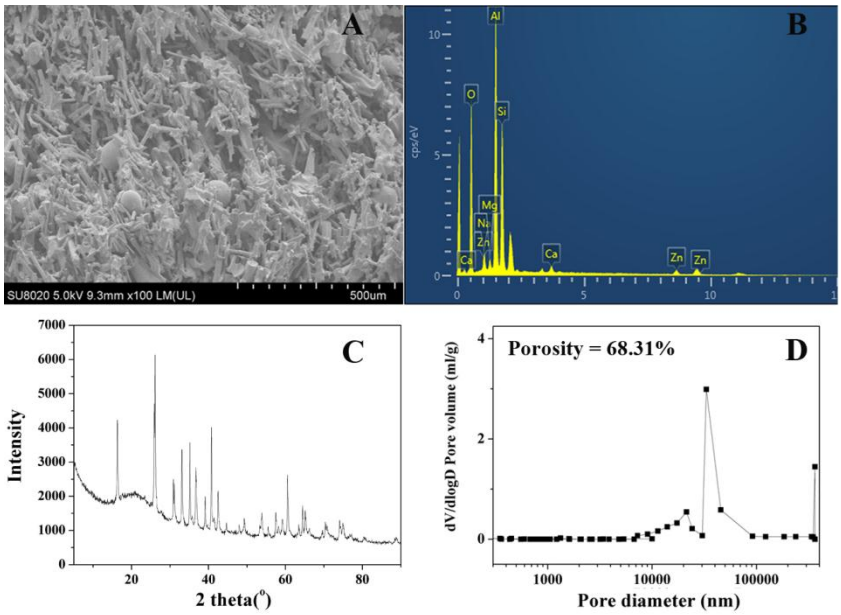

Figure S2. (A) SEM image, (B) EDS mapping, (C) XRD pattern and (D) porosity data of a bare filter.

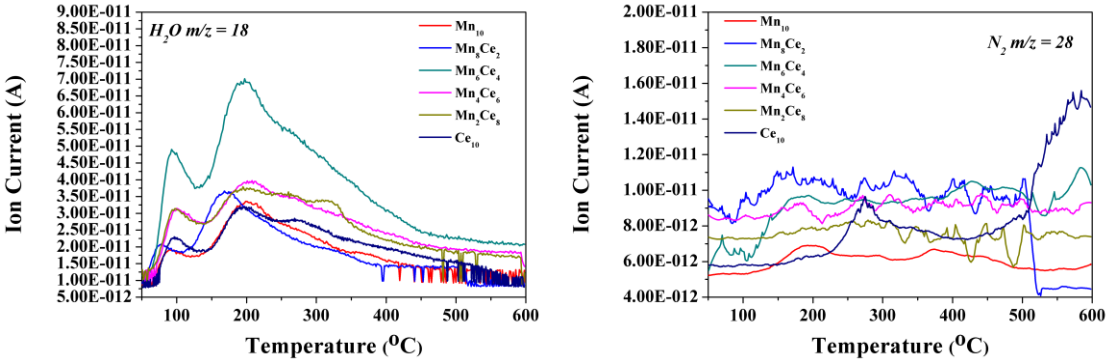

Figure S3. The mass spectra collected during the NH_3-TPD experiments, H_2O and N_2, no NO_2 was detected

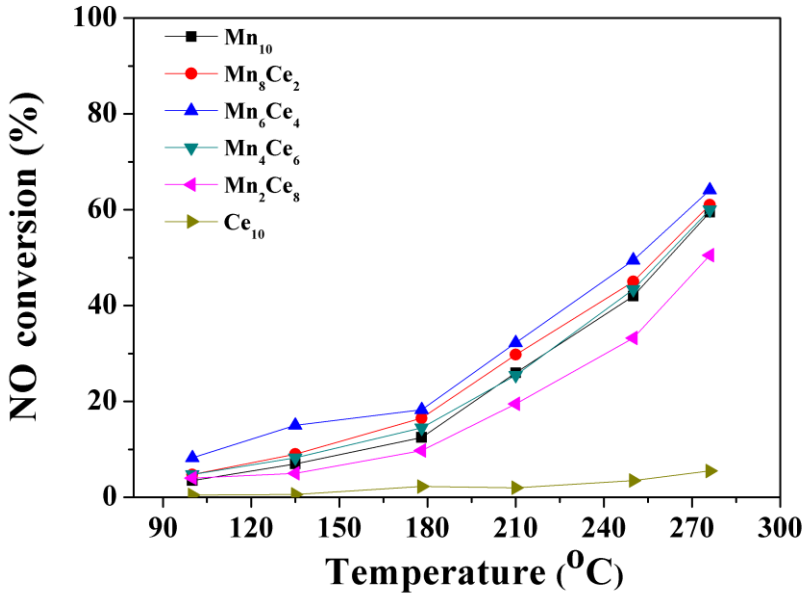

Figure S4. NO oxidation over Mn_xCe_{10-x} (LW = 4%) catalytic filters at different temperatures, reaction condition: [NO] = 400 ppm, [O_2] = 5 vol% and balanced N_2, face velocity = 2 m/min

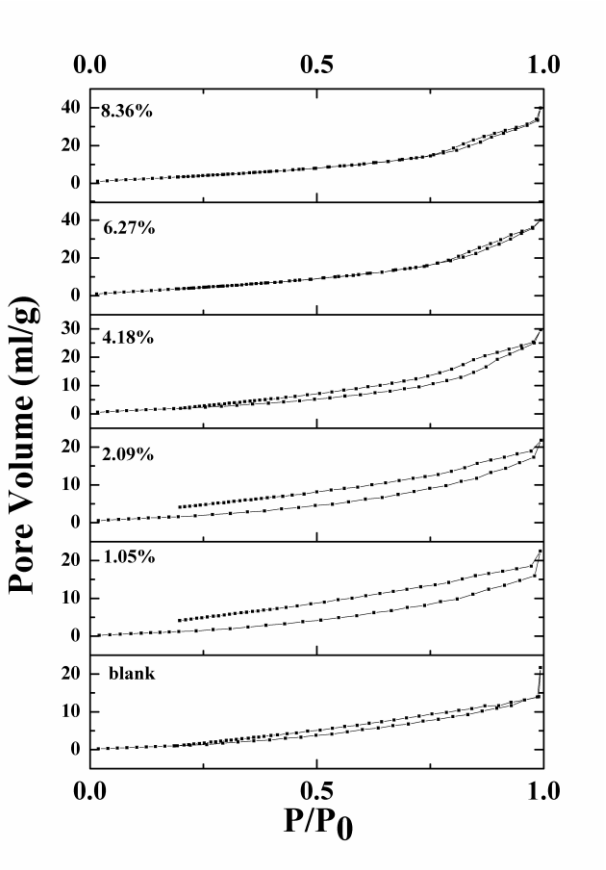

Figure S5. The adsorption isotherm of samples with different loading weights

To further confirm the influence of LW on the redox property, H_2-TPR spectra were performed on CFs with different LWs, as shown in the Figure S6(A). For all samples, there were two main peaks on each spectra. The peak centered at ~260 ^{o}C can be assigned to the reduction of $MnO_2 \rightarrow Mn_2O_3$. With the increase of LW, the peak firstly shifted to lower temperature range, then shifted to higher temperature range. The sample with a LW of 4.18% had lowest reduction temperature, indicating it had the highest Mn^{4+} ratio. H_2 consumption is related to redox properties. We calculated the H_2 consumption by calculating the integral area of each spectra (100-600 ^{o}C), as shown in Figure S6(B). The H_2 consumption generally increased linearly with LWs, which meant the H_2 consumption is related with catalysts on the fibers. However, in this study, as 4.18% had the largest ratio of Mn^{4+}, the reducibility was enough for the reaction.

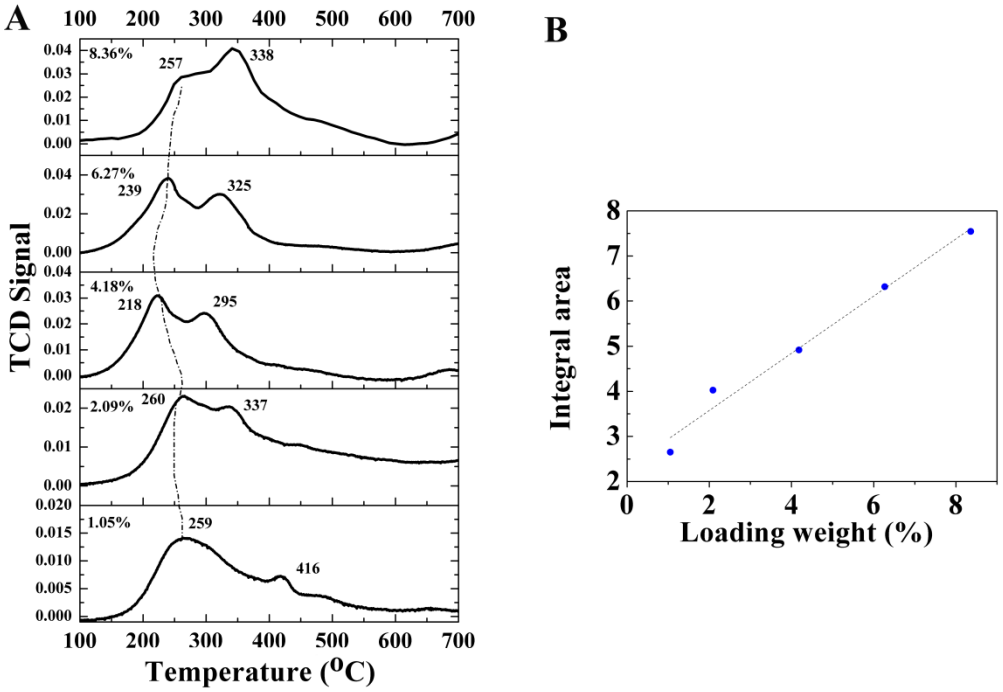

Figure S6. (A) H_2-TPR spectra of CFs with different LWs and (B) the relationship between LW and the integral area of H_2-consumption

Table S1 specific surface area, pore volume and pore diameter of samples with different LWs

LW	SSA (m^2/g)	Pore volume (mL/g)	Pore diameter (nm)
1.05%	6	0.03450	20.70
2.09%	7	0.03391	18.88
4.18%	9	0.04608	19.92
6.27%	18	0.06219	14.00
8.36%	29	0.06598	10.84