Supplementary Information

Fig. S1 XPS spectra of C1s for RGO-CeO_2, RGO and GO.

Fig. S2 (a) Effect of SO_2 on the NO_X (x=1, 2) removal in the present process and (b) the pH variation after introducing exhausted gas into water-isopronol solutions.The SO_2 content is about 500 ppm.

Fig. S3 Ion chromatography of oxidation products for catalytic ozonation over RGO-CeO_2, RGO and CeO_2.

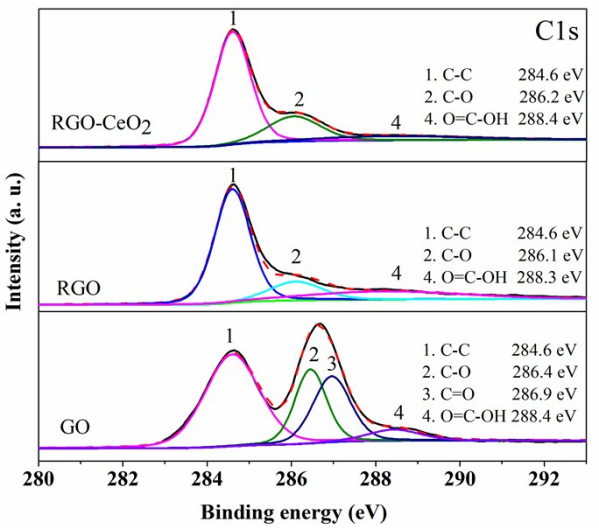
Table S1 Material balance summary for NO_X (x=1, 2).

Fig. S4 (a) N_2 adsorption desorption isotherm curves and (b) the pore size distribution curves for RGO-CeO_2, RGO, and CeO_2.

Fig. S5 Classification of surface hydroxyl groups.

Fig. S6 IR spectra of (a) RGO-CeO_2 and (b) CeO_2 before and after H_2O treatment.

Fig. S7 IR spectra of (a) RGO-CeO_2-O_3 and (b) CeO_2-O_3 before and after NO treatment; (c) RGO-CeO_2 and (d) CeO_2 before and after NO treatment.



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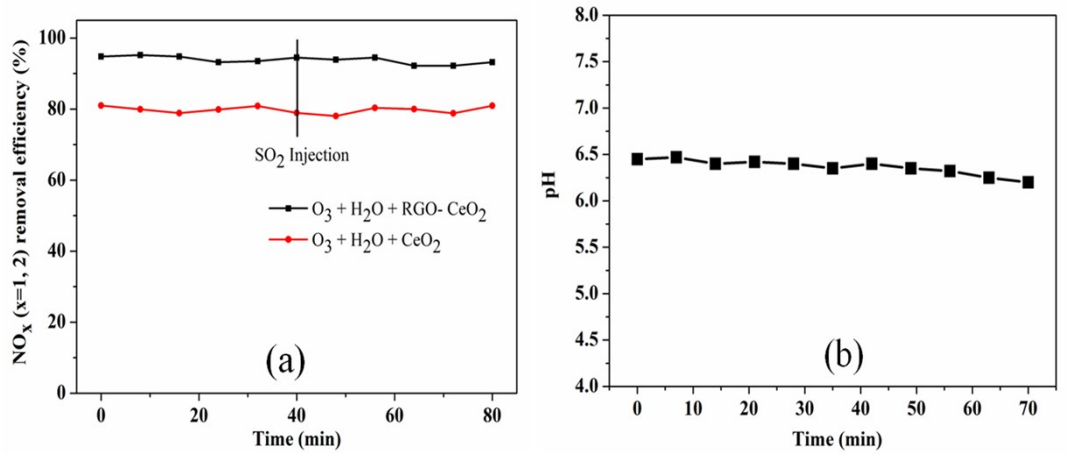

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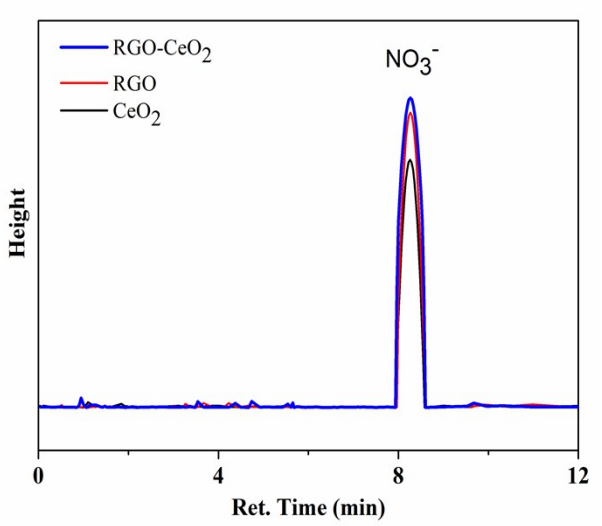
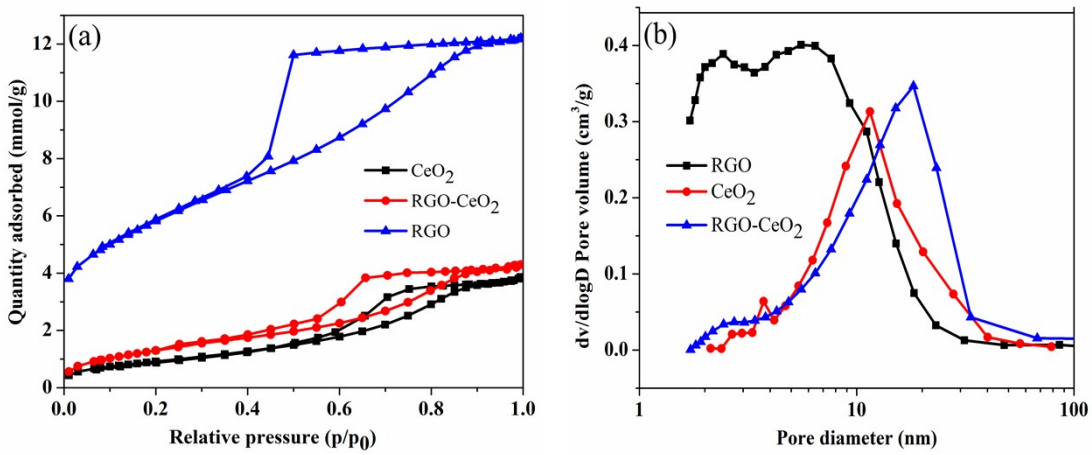


Fig. S3 Ion chromatography of oxidation products for catalytic ozonation over RGO-CeO_2, RGO and CeO_2.

Table S1 Material balance summary for NO_X (x=1, 2).

Category	RGO-CeO_2	RGO	CeO_2
Time t, min	500	500	500
Gas flow Q, mL min^{-1}	185	185	185
Solution volume V_L, mL	50	50	50
C_{in} (NO_X), ppm	465	455	462
C_{out}(NO_X), ppm	15	28	87
C(NO_2^-) actual value, mg L^{-1}	0	0	0
C(NO_3^-) actual value, mg L^{-1}	1981	1858	1642
C(NO_3^-) calculation value, mg L^{-1}	2147	2037	1789
C(NO_3^-) error, %	7.7	8.8	8.2



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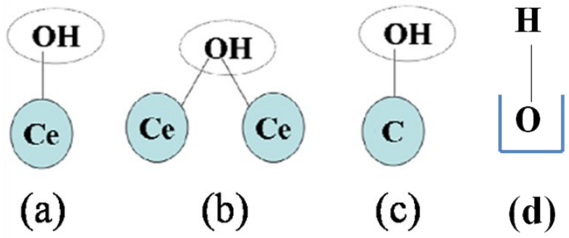

Fig. S5 Classification of surface hydroxyl groups. Surface -OH that connects Ce (a), Ce and Ce (b), C (c), and surface -OH at an oxygen vacancy site (d). The oxygen vacancy is represented by ⌊⌋.

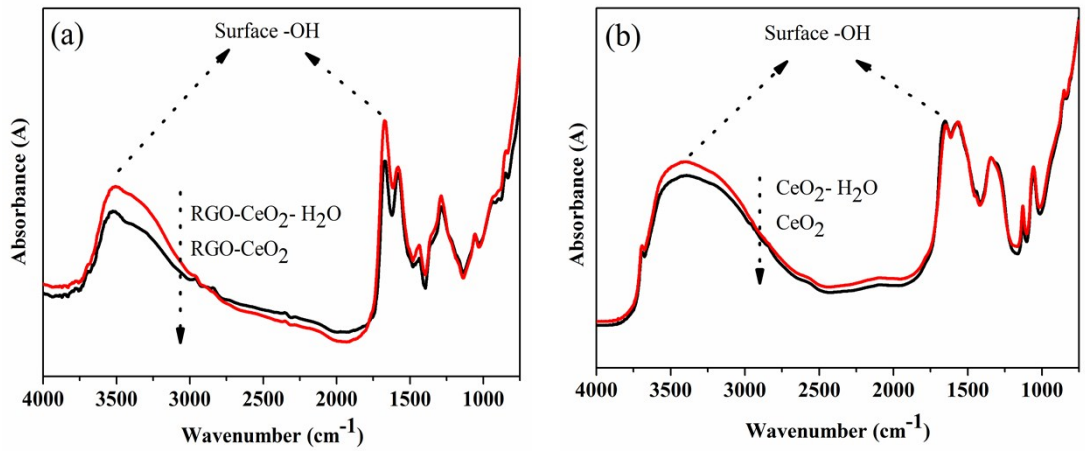

Fig. S6 IR spectra of (a) RGO-CeO_2 and (b) CeO_2 before and after H_2O treatment.

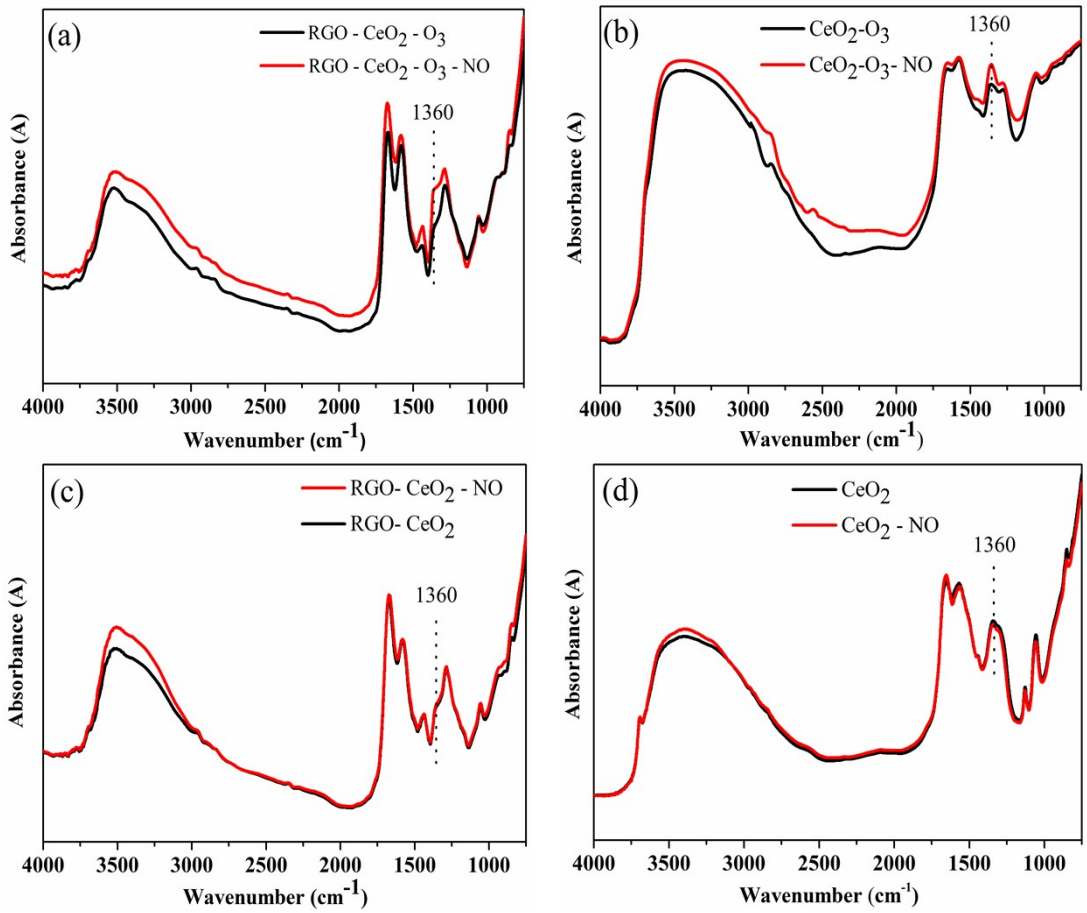

Fig. S7 IR spectra of (a) RGO-CeO_2-O_3 and (b) CeO_2-O_3 before and after NO treatment; (c) RGO-CeO_2 and (d) CeO_2 before and after NO treatment.