

Electronic Supplementary Information

Catalytic oxidation and adsorption of elemental mercury over nanostructured CeO₂–MnO_x catalyst

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Table S1 The chemical compositions of elements of $\text{Ce}_{0.7}\text{Mn}_{0.3}\text{O}_{2-\delta}$ catalysts calcined at 773 and 1073 K.

Sample	Nominal values		Actual values from ICP-OES analysis		Chemical formulae
	Ce	Mn	Ce	Mn	
CeMnO-773	0.7	0.3	0.69	0.31	$\text{Ce}_{0.69}\text{Mn}_{0.31}\text{O}_{2-\delta}$
CeMnO-1073	0.7	0.3	0.69	0.31	$\text{Ce}_{0.69}\text{Mn}_{0.31}\text{O}_{2-\delta}$

Table S2 Summary of binding energies of spent catalysts collected from XPS.

Sample	Binding energies (eV)								
	Ce 3d (u''')	Mn 2p _{3/2}			O 1s			Hg 4f	
		Mn ⁴⁺	Mn ³⁺	Mn ²⁺	O _I	O _{II}	O _{III}	4f _{7/2}	4f _{5/2}
MnO _x	-	643.8	641.7	639.8	529.1	531.5	532.9	101.7	103.5
CeO ₂	915.1	-	-	-	529.2	532.3	-	103.2	108
CeMnO-773	915.4	643.1	641.4	640.9	529.3	531.2	533.4	102.4	107.7

O_I=lattice oxygen, O_{II}=chemisorbed oxygen, O_{III}=adsorbed water/carbonates

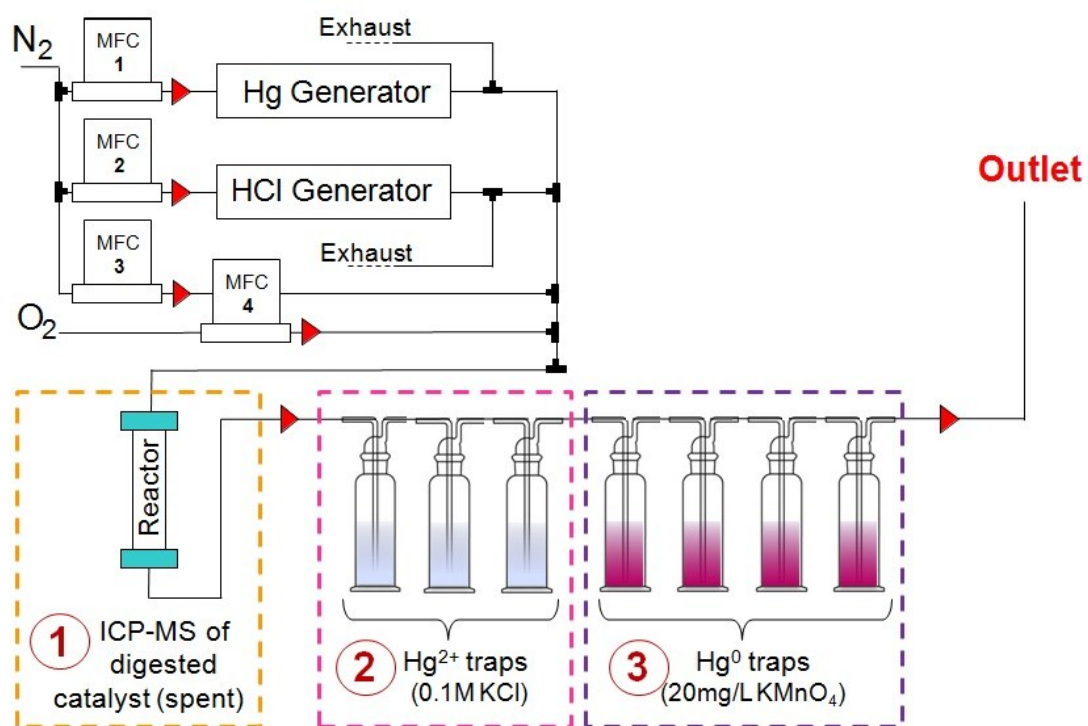


Fig S1 Schematic diagram of the experimental setup.

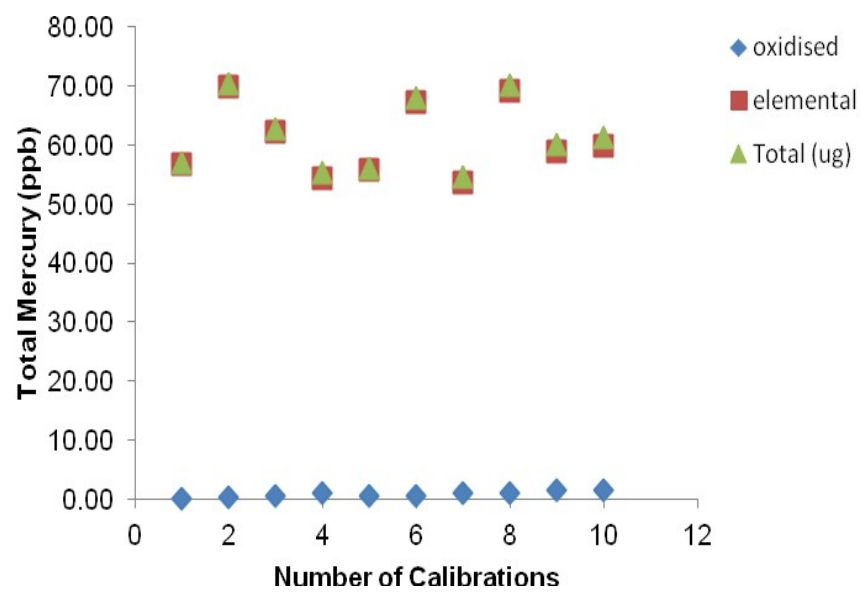


Fig. S2 The calibration experiments for total amount of inlet mercury ($\text{Hg}^0_{\text{inlet}}$).

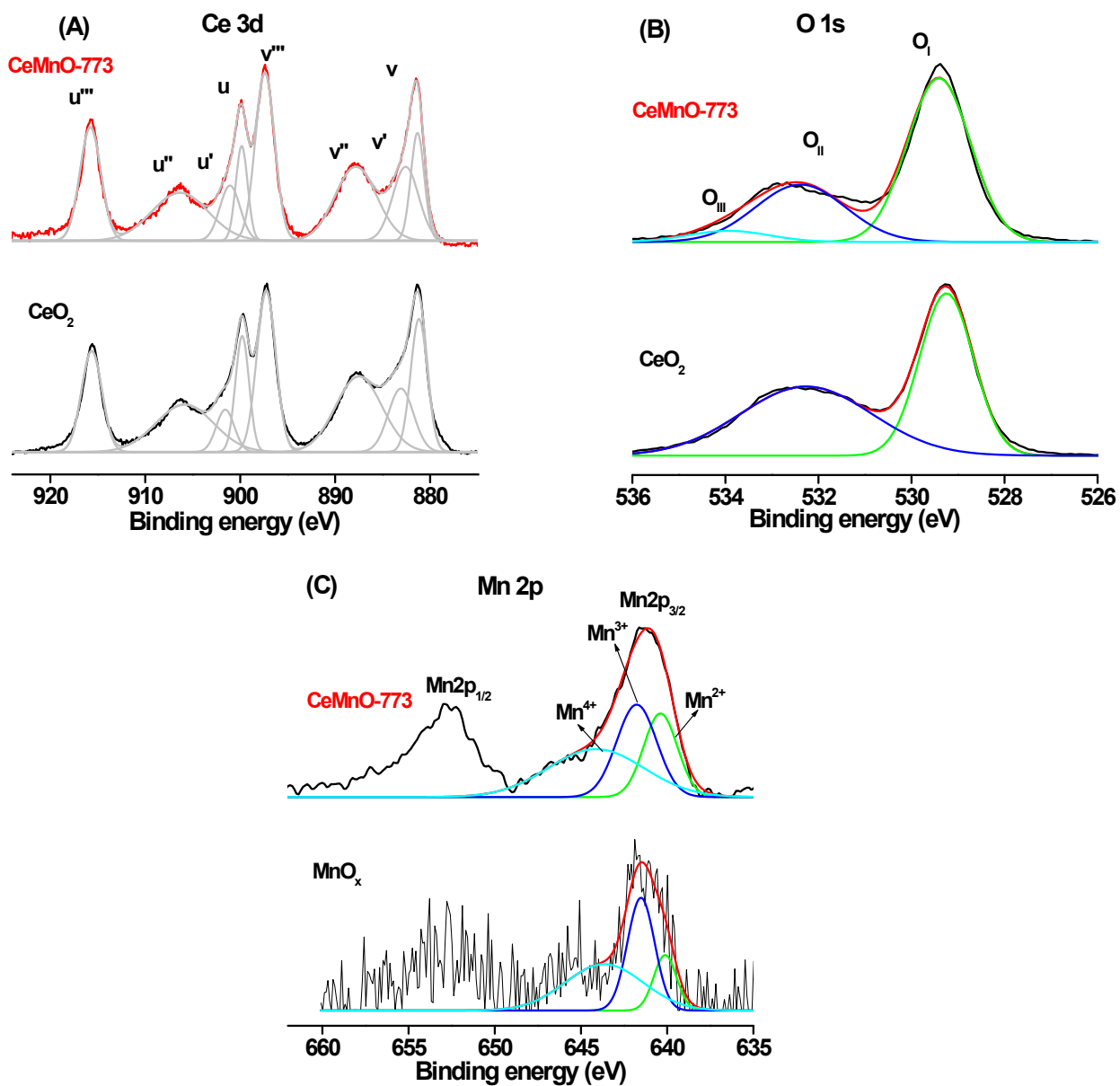


Fig. S3 (A) Ce 3d, (B) O 1s, and (C) Mn 2p XPS spectra of spent CeO₂, MnO_x, and CeO₂-MnO_x catalysts calcined at 773 K.

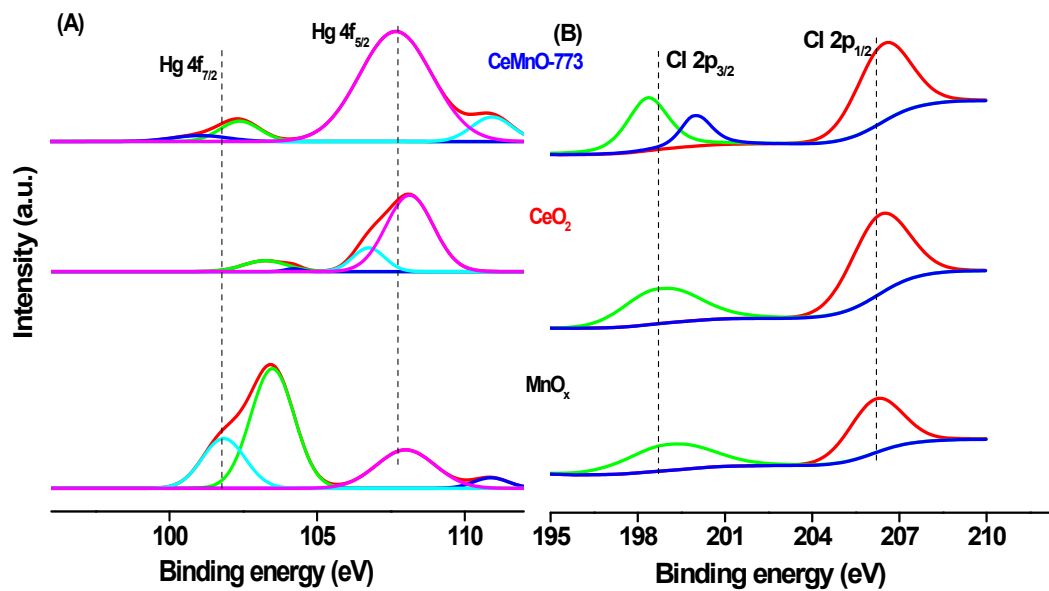


Fig. S4 (A) Hg 4f, (B) Cl 2p XP spectra of spent MnO_x , CeO_2 , and $\text{CeO}_2\text{-MnO}_x$ catalysts calcined at 773 K.