Electronic Supplementary Information

Structural characterization and catalytic evaluation of transition and rare earth metal doped ceria–based solid solutions for elemental mercury oxidation

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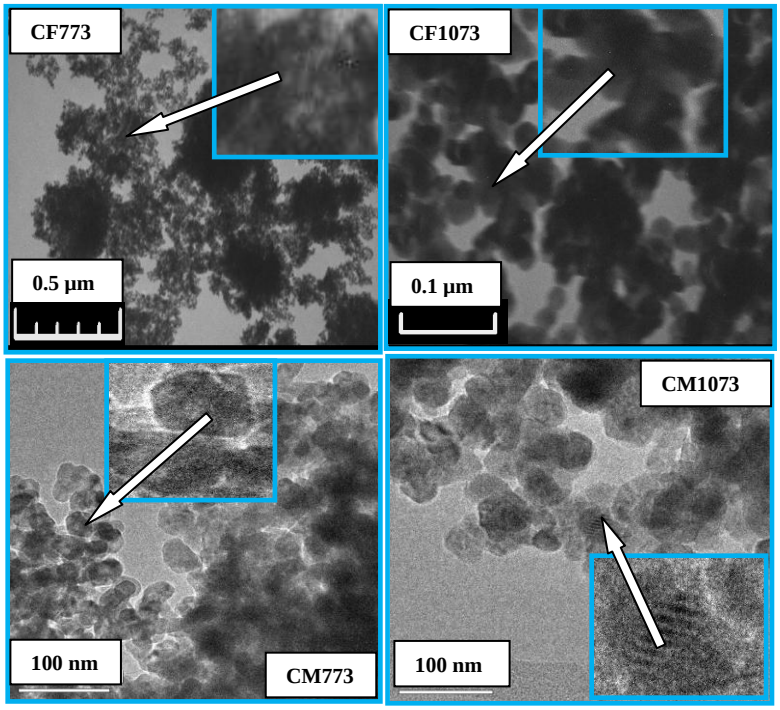

Fig. S1 TEM images of $Ce_{0.8}Fe_{0.2}O_{2-\delta}$ (CF), and $Ce_{0.7}Mn_{0.3}O_{2-\delta}$ (CM) catalysts calcined at 773 and 1073 K.

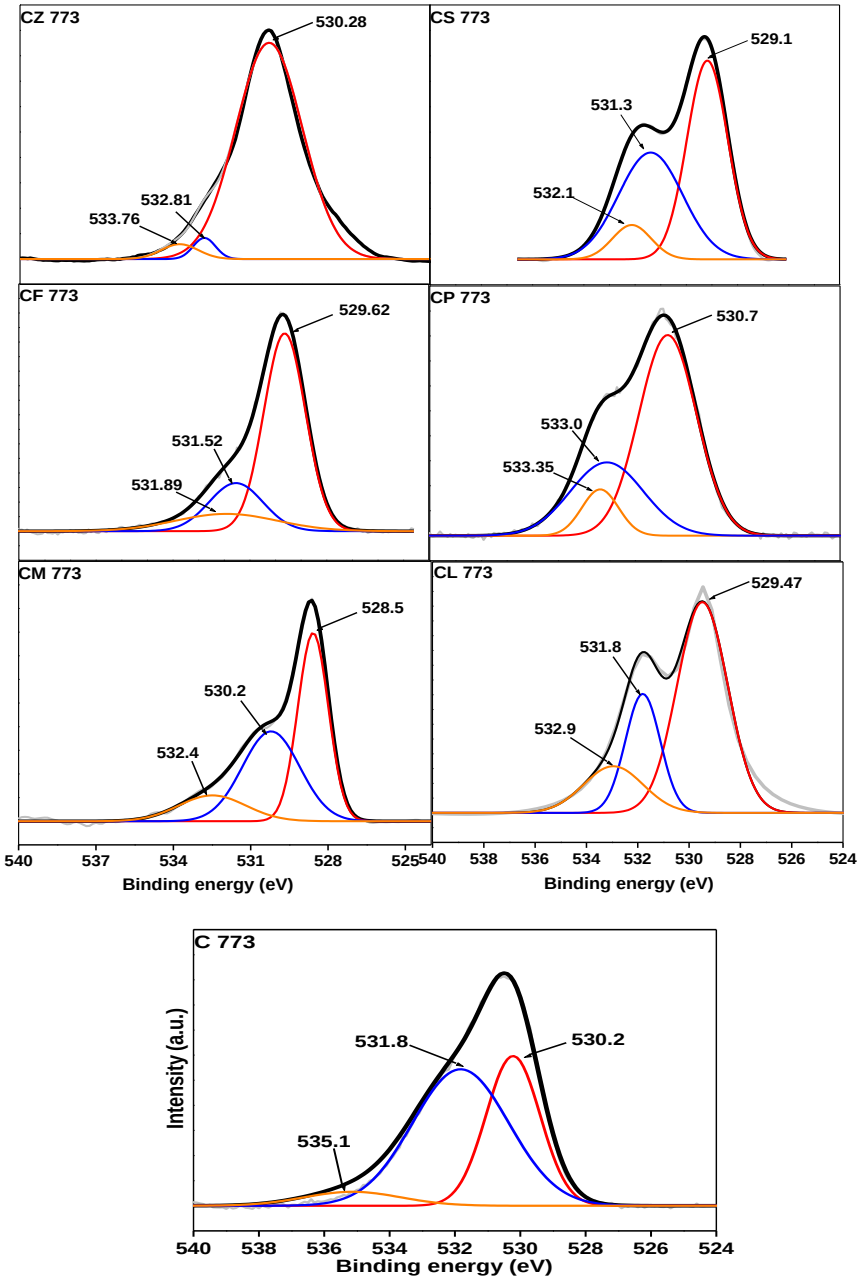

Fig. S2 O 1s XPS spectra of pure ceria (C), $Ce_{0.7}Mn_{0.3}O_{2-\delta}$ (CM), $Ce_{0.8}Fe_{0.2}O_{2-\delta}$ (CF), $Ce_{0.75}Zr_{0.25}O_2$ (CZ), $Ce_{0.8}La_{0.2}O_{2-\delta}$ (CL), $Ce_{0.8}Pr_{0.2}O_{2-\delta}$ (CP), and $Ce_{0.8}Sm_{0.2}O_{2-\delta}$ (CS) catalysts calcined at 773 K.

Table S1. Binding energies and surface atomic concentrations of $Ce_{0.7}Mn_{0.3}O_{2-\delta}$ (CM), $Ce_{0.8}Fe_{0.2}O_{2-\delta}$ (CF), $Ce_{0.75}Zr_{0.25}O_2$ (CZ), $Ce_{0.8}La_{0.2}O_{2-\delta}$ (CL), $Ce_{0.8}Pr_{0.2}O_{2-\delta}$ (CP), $Ce_{0.8}Sm_{0.2}O_{2-\delta}$ (CS), and pure ceria (C) catalysts calcined at 773 K.

catalyst	**Ce 3d (u''') eV**	**O 1s (O_A) eV**	**surface atomic concentration (%)**		
			O_A	O_B	O_C
CM 773 K	916.1	528.5	45.5	40.8	13.7
CF 773 K	916.9	529.6	65.5	20.5	14
CZ 773 K	916.7	530.2	93.4	3.0	3.6
CL 773 K	916.6	529.3	65.3	22.7	12
CP 773 K	917.9	530.7	62.1	28.7	9.2
CS 773 K	916.9	529.2	49.8	41.9	8.3
C 773 K	918.1	530.2	35.83	58.19	5.96

O_A= lattice oxygen; O_B = chemically adsorbed oxygen or weakly bonded oxygen;

O_C = oxygen in hydroxyl or surface adsorbed water.