Supporting Information

Table S1 XPS data from the de-convolution of the O1s peak and the content of the gold and the cerium

Sample	O_α/(At.%)	O_β/(At.%)	O_γ/(At.%)	$(O_\beta + O_\gamma)/O_T$[a)]	O_α/Mn	Au/(wt.%)[b)]	Ce/(wt.%)[b)]
MnO_2-S1	54.61	40.86	4.53	0.45	1.45	–	8.61
MnO_2-S2	61.86	25.78	12.36	0.38	1.10	–	2.73
MnO_2-S3	52.85	27.85	19.30	0.47	1.11	–	1.85
MnO_2-S3 -used	50.73	29.14	20.13	0.49	1.07	–	-
Au/MnO_2-S1	44.97	31.56	23.47	0.55	1.24	0.716	7.15
Au/MnO_2-S2	54.54	24.54	20.92	0.45	1.05	0.709	3.29
Au/MnO_2-S3	51.56	24.83	23.61	0.48	1.10	0.736	1.80
Au/MnO_2-S3 -used	70.65	21.29	8.07	0.29	1.35	–	-

Notes: a) O_T, total surface oxygen; b) the content was obtained by EDX testing

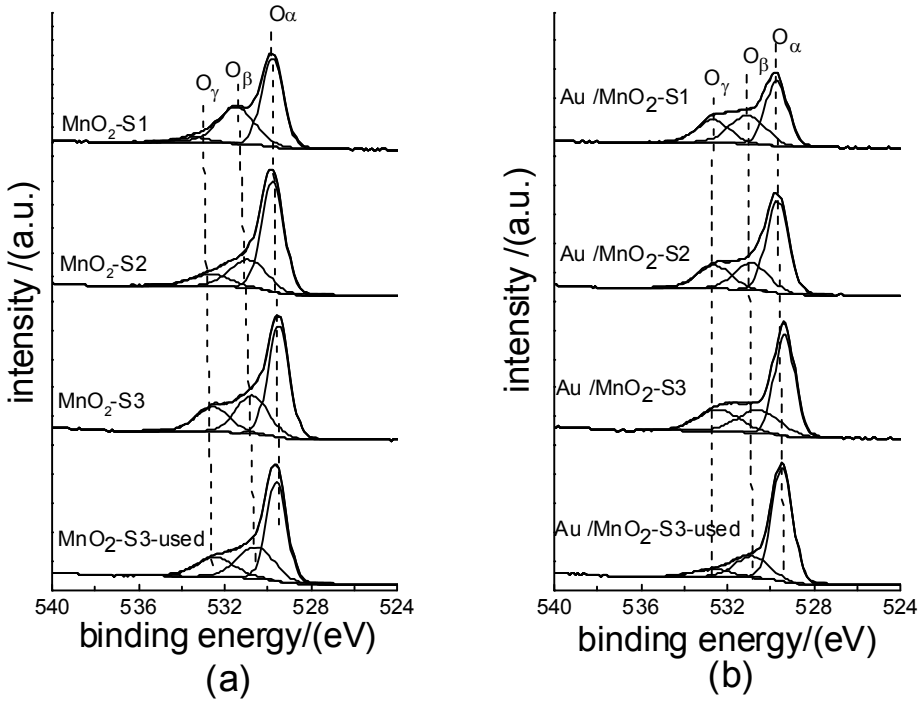
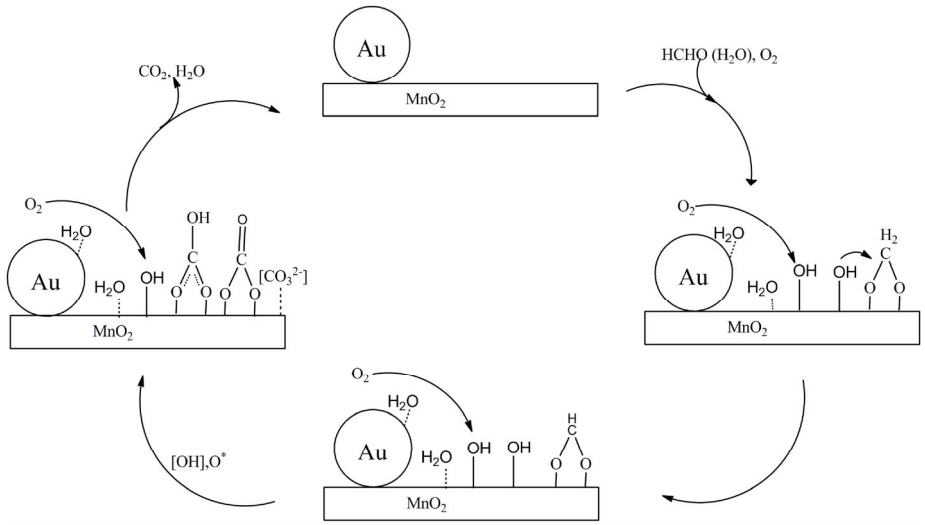


Fig. S1 O1s XPS spectra of (a) MnO_2 and used MnO_2-S3 samples, and (b) the corresponding Au/MnO_2 and used Au/MnO_2-S3 catalysts



Scheme S1 Proposed mechanism for HCHO oxidation over Au/MnO_2 hierarchical