

Supporting Information for Publication

Salt-induced formation of hollow and mesoporous $\text{CoO}_x/\text{SiO}_2$ spheres and their catalytic behaviors in toluene oxidation

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Table S1**Elemental analysis of raw waste powder and silicate supernatant analyzed by the SEM-EDS and ICP-MS**

Sample	Si	F	O	N	Na
Raw waste powder (wt%) ^a	28.82	47.82	17.54	5.82	-
Supernatant (ppm) ^b	32750	-	- ^c	-	84220

a: sample analyzed by the SEM-EDS analysis

b: sample analyzed by the ICP-MS analysis

c: non-detected.

Table S2**Catalytic activity and structural properties of fresh and used catalysts.**

Catalysts	Toluene conversion (%)	S _{BET} (m ² /g)	V _P (cm ³ /g)
CoO _x /mSiO ₂ -Fresh	-	471	0.47
CoO _x /mSiO ₂ -250 °C-33 h	94	419	0.46
Co ₃ O ₄ -Fresh	-	13	0.03
Co ₃ O ₄ -250 °C-29 h	5	5	0.01

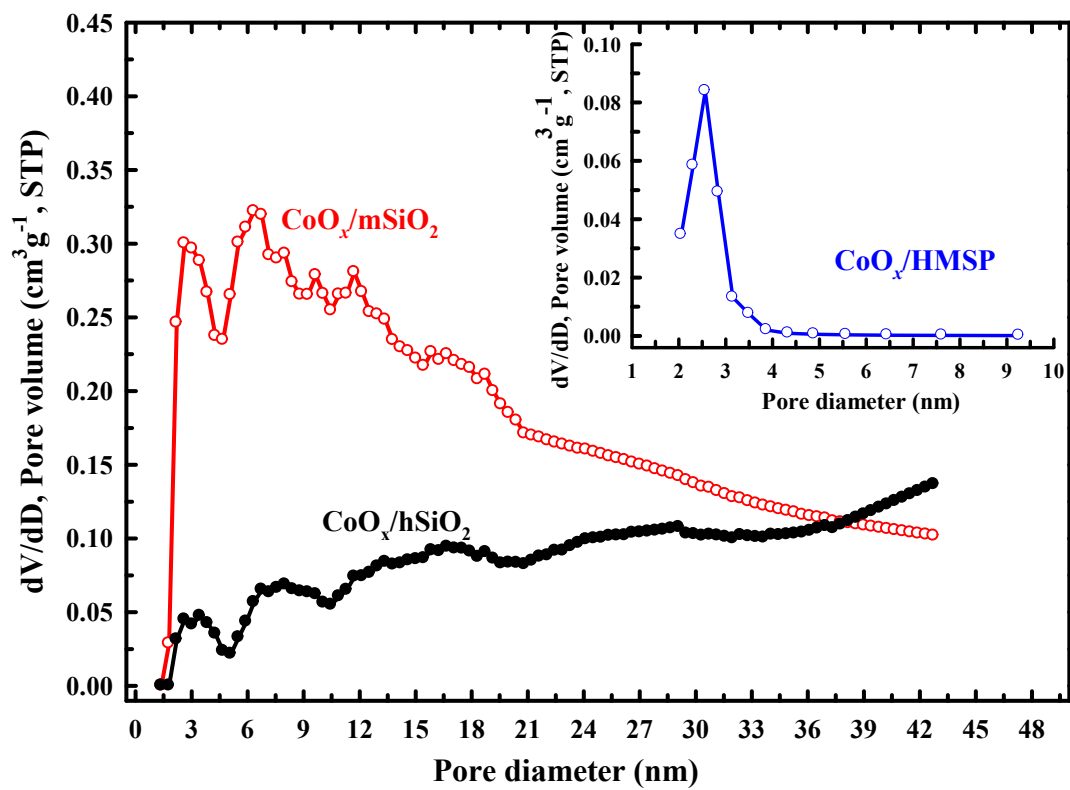


Fig. S1 Pore size distributions of $\text{CoO}_x/\text{hSiO}_2$, $\text{CoO}_x/\text{mSiO}_2$ and CoO_x/HMSP particles.

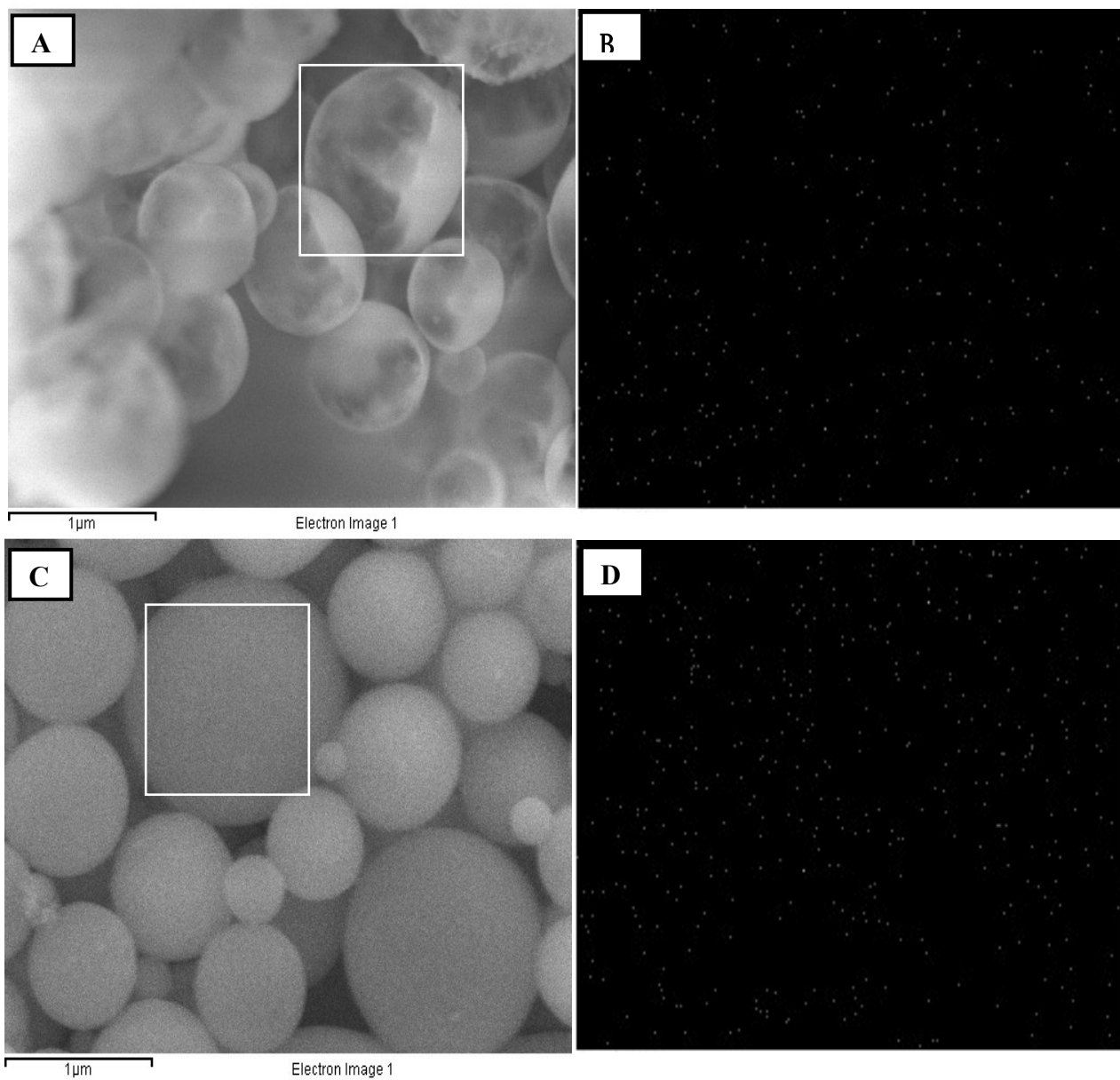


Fig. S2 SEM images and elemental mapping of Co species of $\text{CoO}_x/\text{hSiO}_2$ (A, B) and $\text{CoO}_x/\text{mSiO}_2$ (C, D) samples.

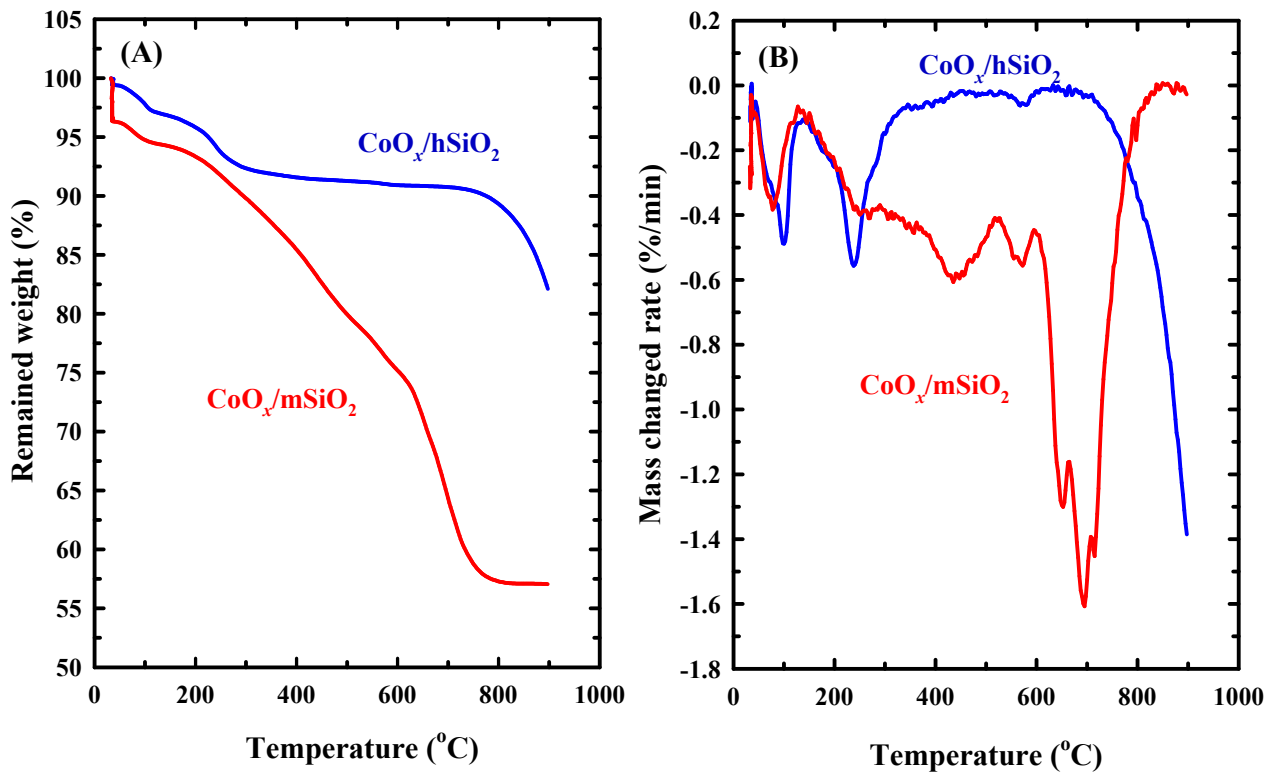


Fig. S3 TG/DTA profiles of as-prepared $\text{CoO}_x/\text{hSiO}_2$ and as-prepared $\text{CoO}_x/\text{mSiO}_2$.

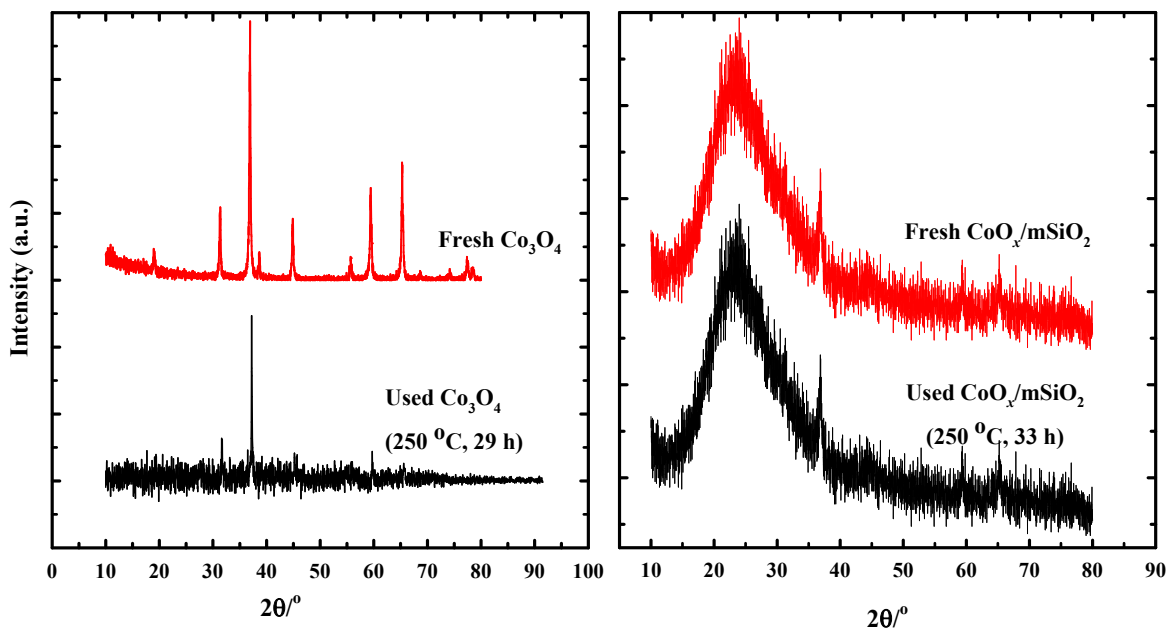


Fig. S4 XRD patterns of fresh and used catalysts.

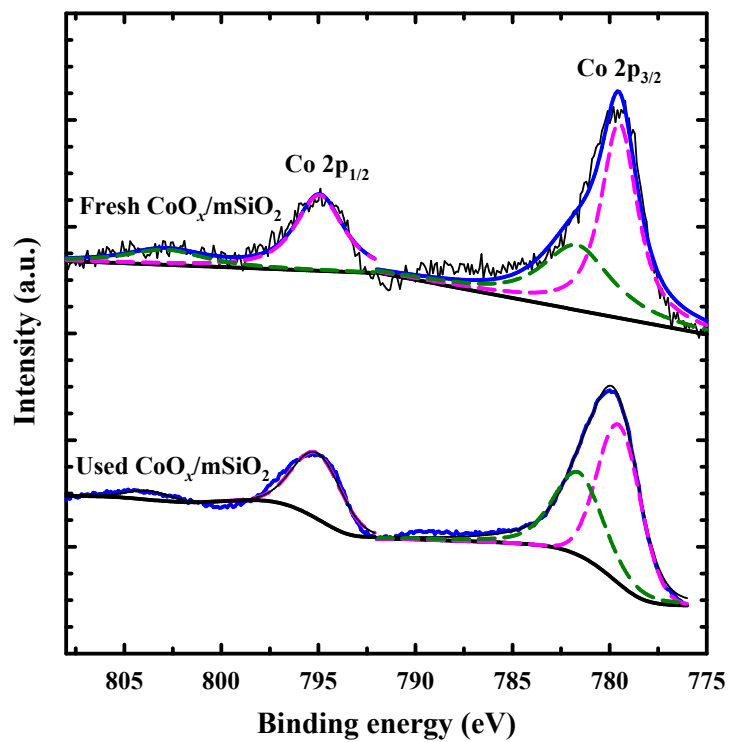


Fig. S5 Co 2p XPS spectra of fresh and used CoO_x/mSiO₂ catalysts.