

Figure 1 XRD patterns of the prepared materials. A) CuCe mixed oxides; B) gold promoted catalysts.

Figure 2 Raman spectra of the synthesized solids. A) CuCe mixed oxides; B) gold promoted catalysts compared with CuCe mixed oxides.

Figure 3 UV-vis spectra. A) CuCe mixed oxides; B) gold promoted catalysts.

Figure 4 H₂-TPR profiles. A) CuCe mixed oxides; B) gold promoted catalysts.

Figure 5 Catalytic behavior in the WGS reaction using a model mixture (30% H₂O + 4.5 % CO balanced in N₂) A) CuCe mixed oxides; B) activity at 210 °C of the prepared mixed oxides; C) gold promoted catalysts.

Figure 6 Catalytic performance in the WGS reaction using a post-reforming mixture (50% H₂; 12% CO₂; 30% H₂O; 11% CO) A) CuCe mixed oxides; B) gold promoted catalysts.

Figure 7 Catalytic screening in the CO-PrOx reaction of the prepared CuCe materials. A) CO conversion; B) Selectivity towards CO₂.

Figure 8 Catalytic screening in the CO-PrOx reaction of the prepared gold promoted catalysts. A) CO conversion; B) Selectivity towards CO₂.

Table 1 Chemical composition of the prepared catalysts.

Sample	CeO₂ (wt.%)	CuO (wt.%)	Au (wt.%)	CuO/CeO₂ weight ratio
CuCe-0.4	7.7	3.1	-	0.40
Au/CuCe-0.4	8.1	3.3	1.5	0.40
CuCe-0.6	13.9	9.2	-	0.66
Au/CuCe-0.6	13.9	7.7	1.4	0.55
CuCe-0.8	13.8	10.6	-	0.76
Au/CuCe-0.8	13.5	9.4	1.9	0.70
CuCe bulk	84.2	15.8	-	0.18
Au/CuCe bulk	86.5	11.7	1.8	0.14

Table 2. Miscellaneous samples features. CeO₂ crystallite size (*D*) and lattice parameter (*a*). Estimation of oxygen vacancies population (O_v/F_{2g} ratio) and ceria direct and indirect band gap. Reducibility percentage (RP).

Sample	¹ Crystallite size <i>D</i> (nm)	² Cell parameter <i>a</i> (Å)	³ O _v /F _{2g} Area ratio	Direct band gap (eV)	Indirect band gap (eV)	RP (%)
CuCe-0.4	6.7	5.401	0.60	2.88	2.50	71.8
Au/ CuCe-0.4	6.5	5.400	0.53	2.67	2.21	53.8
CuCe-0.6	4.9	5.394	0.98	2.97	2.25	55.1
Au/CuCe-0.6	4.8	5.398	0.82	2.56	1.85	60.1
CuCe-0.8	4.5	5.397	1.42	2.83	2.34	44.5
Au/ CuCe-0.8	4.6	5.395	1.19	2.28	1.70	46.4
CuCe bulk	8.1	5.396	0.06	2.97	2.52	24.5
Au/CuCe bulk	7.7	5.394	0.04	2.68	2.23	16.1

¹ Calculated from XRD data, with Scherrer's equation and (111) crystallographic plane.

² Calculated from XRD data, with Bragg's equation for a cubic cell.

³ Calculated from Raman Spectra.

Table 3: CO-PrOx and WGS specific reaction rates at 130 °C and 180 °C respectively. All the values are referred to the amount of active phase which is considered the sum in moles of Au, CuO and CeO₂ in the multicomponent catalysts.

Sample	CO-PrOx rates (mol CO converted/ s*mol active phase *10 ⁻⁴)	WGS rates (mol CO converted/ s*mol active phase *10 ⁻⁴)
CuCe bulk	6.58	2.25
CeCu-0.4	13.80	1.24
CeCu-0.6	10.43	4.69
CeCu-0.8	4.65	6.13
Au/CuCe bulk	7.32	1.31
Au/CeCu-0.4	21.67	4.87
Au/CeCu-0.6	13.02	5.41
Au/CeCu-0.8	4.29	6.57

Figure 1

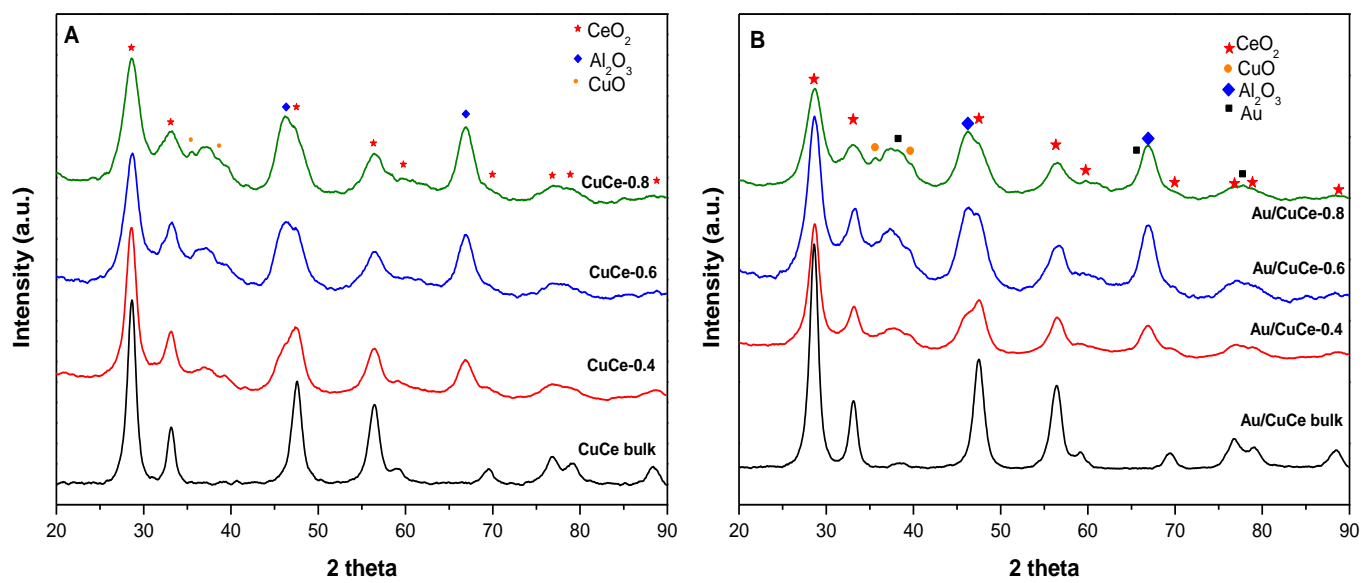


Figure 2

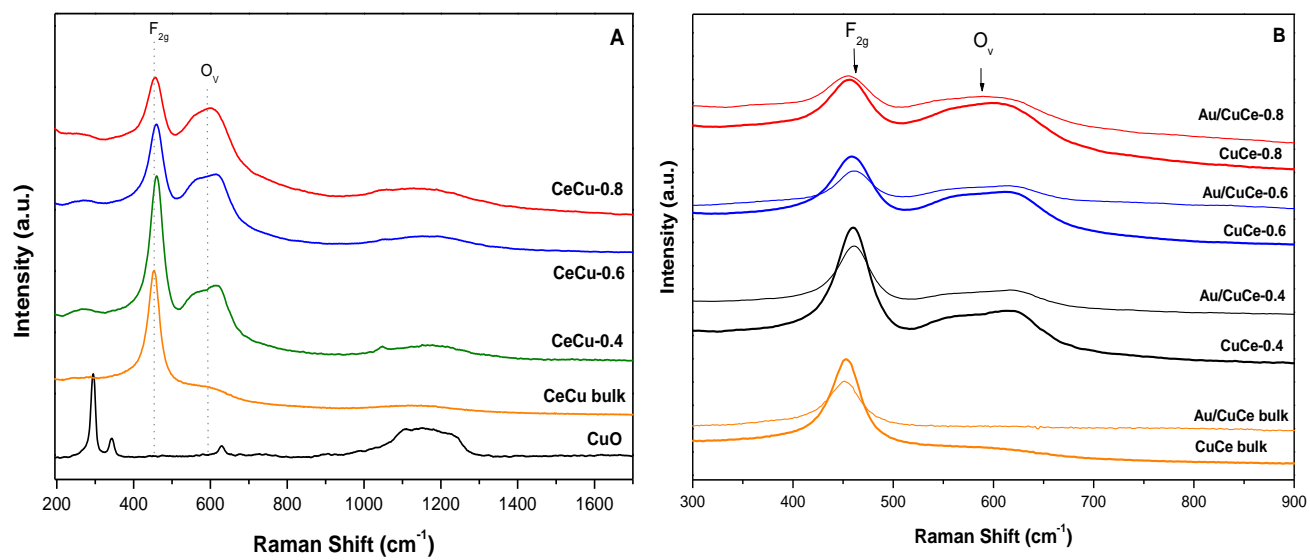


Figure 3

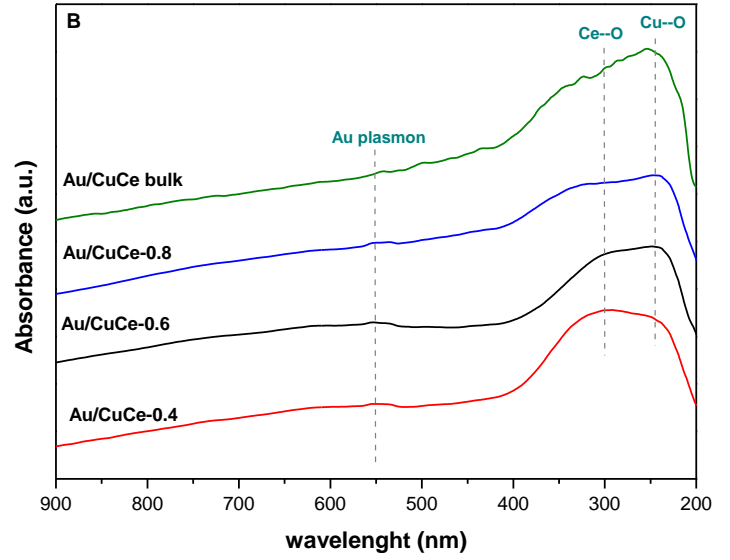
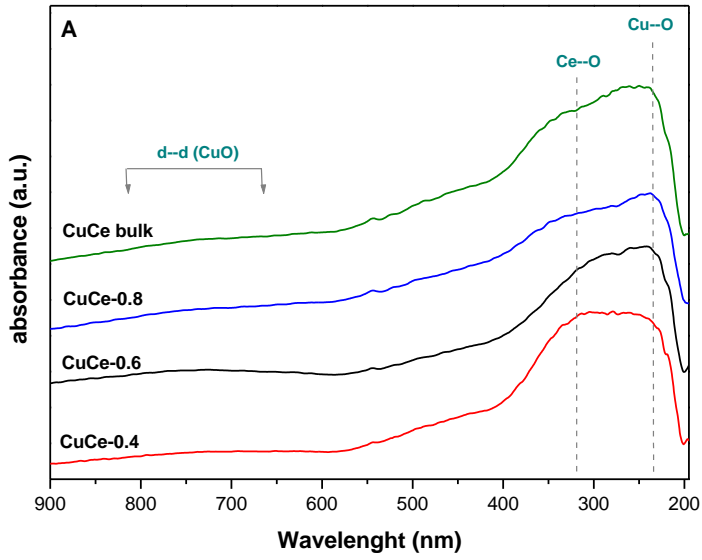


Figure 4

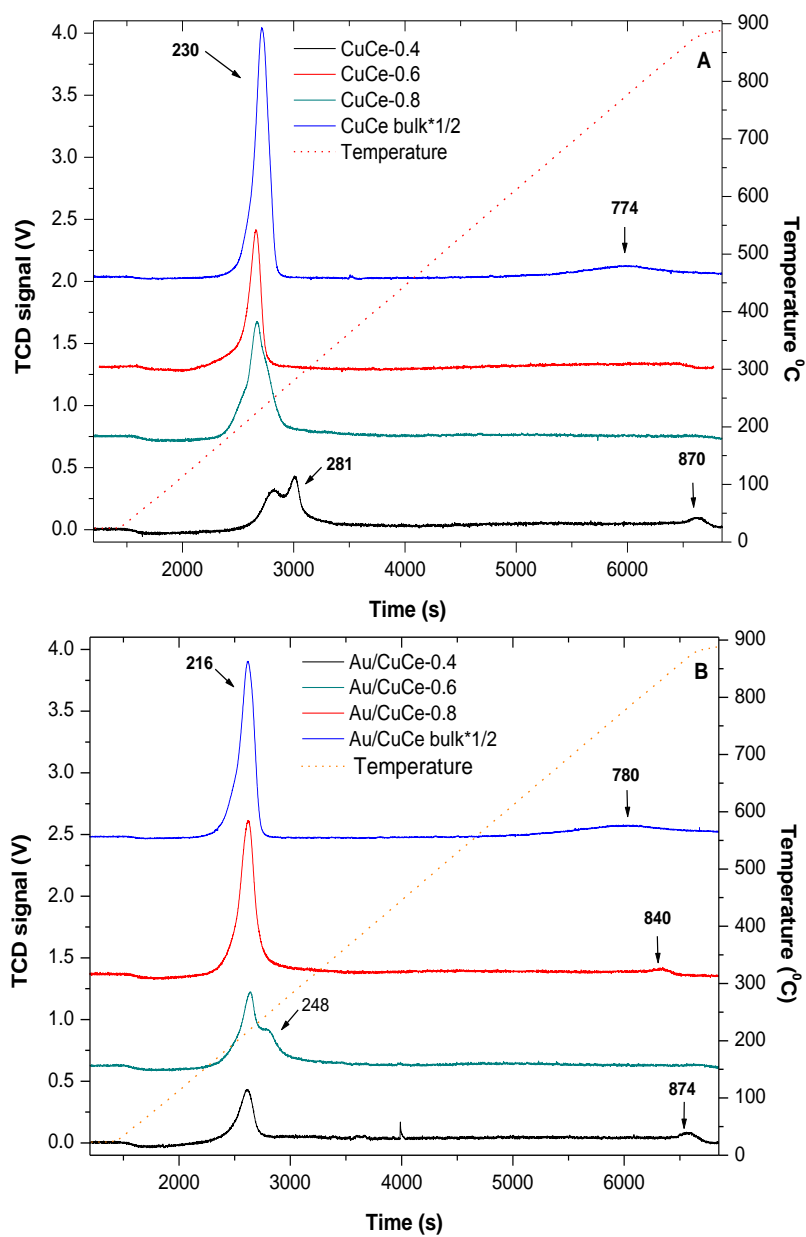


Figure 6

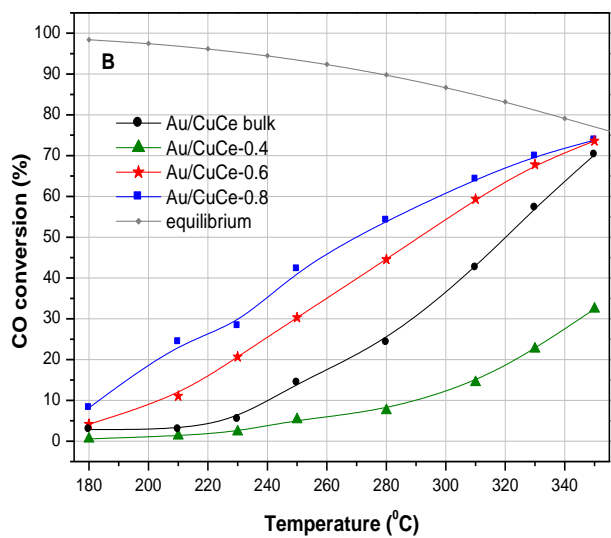
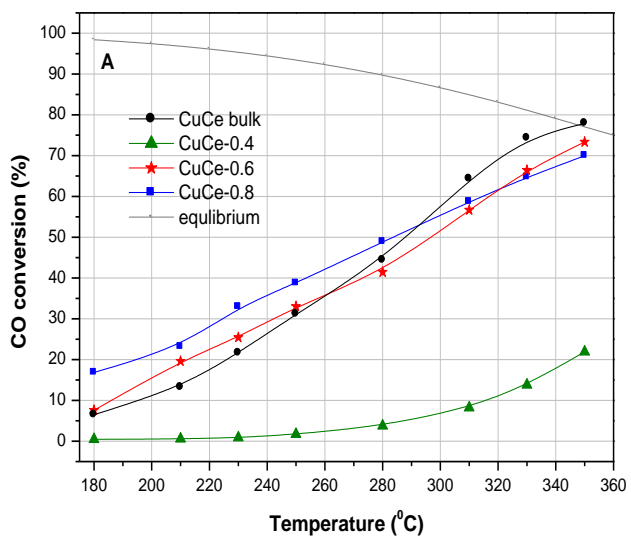


Figure 7

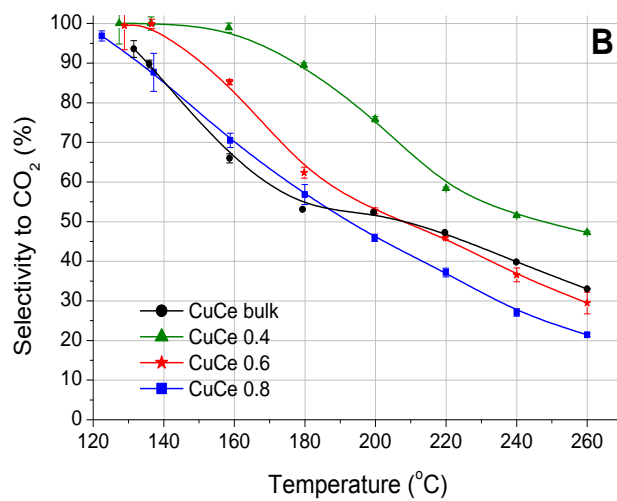
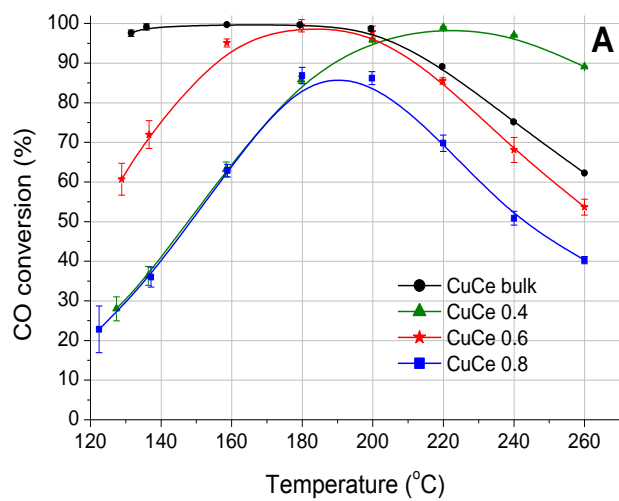


Figure 8

