Figure 1 XRD patterns of the studied materials. A) before calcination; B) calcined supports; C) gold based catalysts; D) pre and post reaction comparison.

Figure 2. FTIR spectra of the prepared samples. A) supports B) gold based catalysts.

Figure 3 Raman spectra of the mixed oxides A) and B) before calcination C) calcined supports.

Figure 4 H_2-TPR profiles of the prepared materials: A) supports B) gold based catalysts.

Figure 5 Catalytic screening of the prepared supports in model WGS conditions.

Figure 6 WGS behavior of the prepared gold based catalysts in model WGS conditions.

Figure 7 WGS behavior of the prepared gold based catalysts in post-reforming mixtures.

Figure 8 Long thermal stability test of the most active sample.

Figure 9 Start/Stop cycles test of the Au/HT 2.8 catalyst.

Table 1. Experimental conditions of the catalytic tests

	Model	**Realistic**
CO (vol. %)	4.5	9
H_2O (kPa)	31.1	31.1
CO_2 (vol. %)	---	11
H_2 (vol. %)	---	50
N_2 (vol. %)	Balance	---
Bed volume (cm^3)	1.5	1.5
GHSV (h^{-1})	4000	4000

Table 2.Chemical composition of the prepared mixed samples

Sample	**Au % (w/w)**	**CuO % (w/w)**	**ZnO % (w/w)**	**Al_2O_3 % (w/w)**	**CuO/ZnO**
HT 1.4	-	35.82	25.97	38.21	1.38
HT 2.8	-	47.73	17.40	34.87	2.74
HT 5.6	-	51.95	10.34	37.71	5.02
AuHT 1.4	1.05	35.74	25.81	37.40	1.38
AuHT 2.8	0.93	41.03	15.18	42.80	2.70
AuHT 5.6	1.2	43.57	8.70	46.60	5.01

Table 3. WGS specific reaction rates at 180 °C. All the values are referred to the amount of active phase which is considered the sum in moles of Au and Cu.

Sample	WGS rates (mol CO converted/s × mol active phase × 10^{-4})
HT 1.4	0.14
HT 2.8	0.16
HT 5.6	0.15
AuHT 1.4	6.70
AuHT 2.8	6.26
AuHT 5.6	5.8
Au/CuCe bulk[42]	1.31

Figure 1

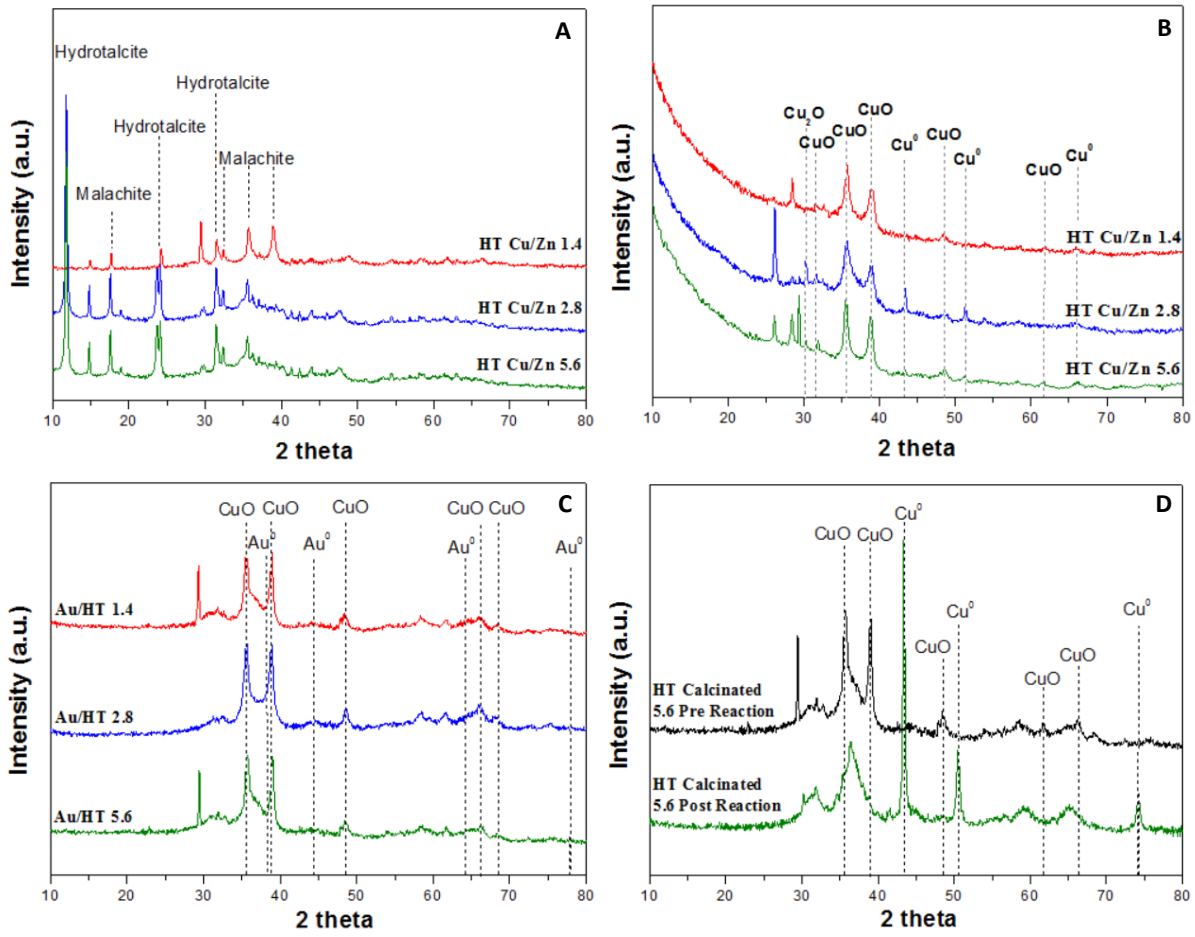

A
Hydrotalcite
Hydrotalcite
Hydrotalcite
Malachite
Malachite
HT Cu/Zn 1.4
HT Cu/Zn 2.8
HT Cu/Zn 5.6
Intensity (a.u.)
2 theta
B
Cu2O
CuO
CuO
CuO
Cu0
CuO
Cu0
CuO
Cu0
HT Cu/Zn 1.4
HT Cu/Zn 2.8
HT Cu/Zn 5.6
Intensity (a.u.)
2 theta
C
CuO
CuO
CuO
CuO
CuO
Au0
Au0
Au0
Au0
Au/HT 1.4
Au/HT 2.8
Au/HT 5.6
Intensity (a.u.)
2 theta
D
Cu0
CuO
CuO
Cu0
Cu0
CuO
CuO
CuO
HT Calcinated
5.6 Pre Reaction
HT Calcinated
5.6 Post Reaction
Intensity (a.u.)
2 theta

Figure 2

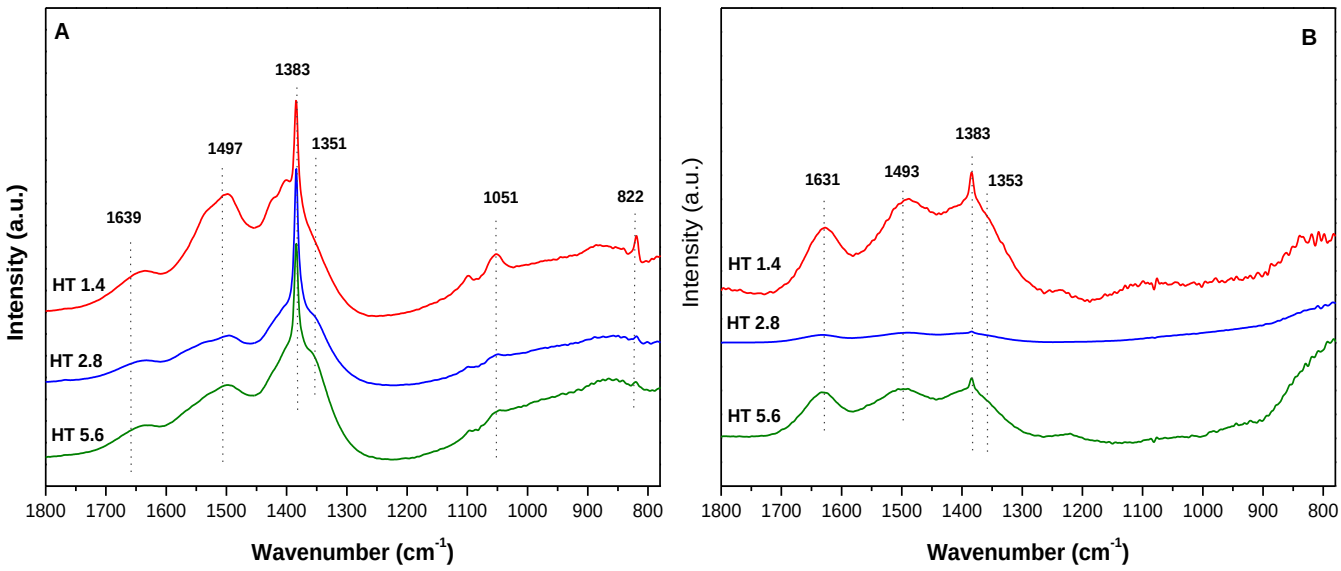

A
1383
1497
1351
1639
1051
822
HT 1.4
HT 2.8
HT 5.6
Intensity (a.u.)
1800 1700 1600 1500 1400 1300 1200 1100 1000 900 800
Wavenumber (cm-1)
B
1383
1631
1493
1353
HT 1.4
HT 2.8
HT 5.6
Intensity (a.u.)
1800 1700 1600 1500 1400 1300 1200 1100 1000 900 800
Wavenumber (cm-1)

Figure 3

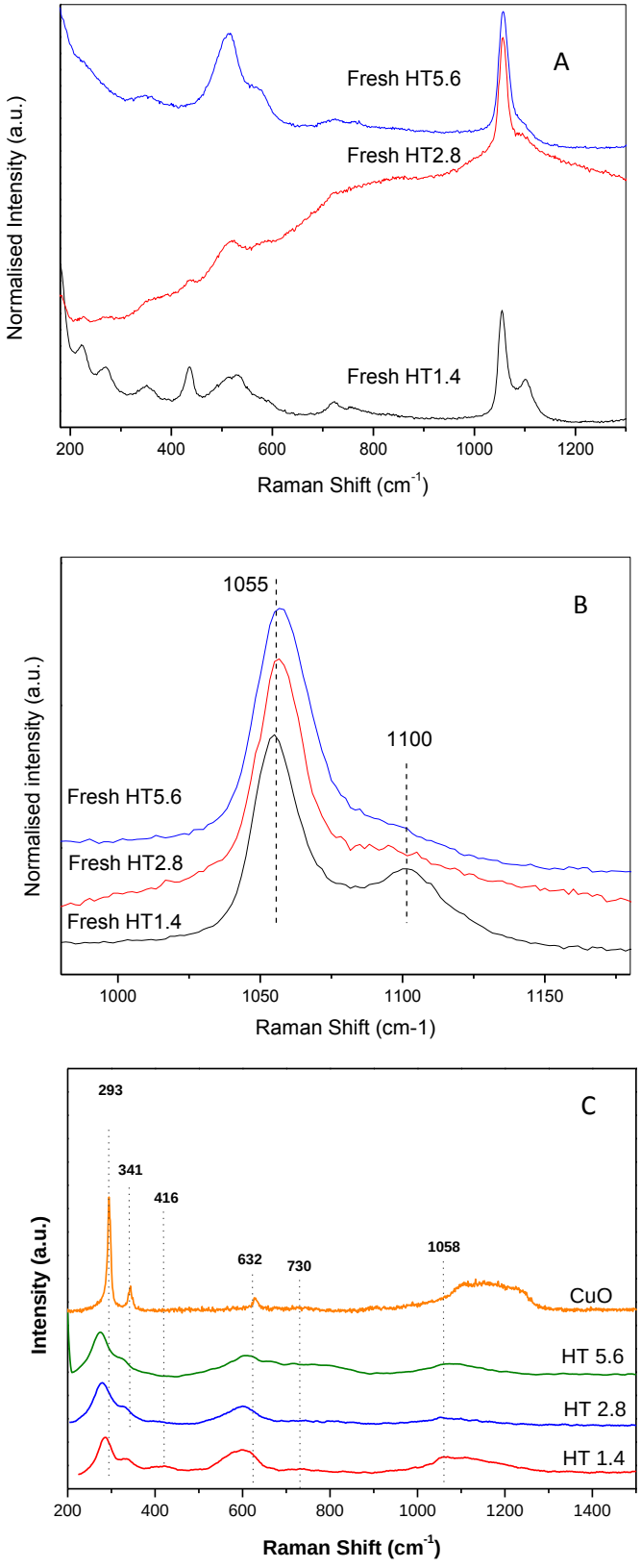

A
Fresh HT5.6
Fresh HT2.8
Fresh HT1.4
Normalised Intensity (a.u.)
200
400
600
800
1000
1200
Raman Shift (cm-1)
B
1055
1100
Fresh HT5.6
Fresh HT2.8
Fresh HT1.4
Normalised intensity (a.u.)
1000
1050
1100
1150
Raman Shift (cm-1)
C
293
341
416
632
730
1058
CuO
HT 5.6
HT 2.8
HT 1.4
Intensity (a.u.)
200
400
600
800
1000
1200
1400
Raman Shift (cm-1)

Figure 4

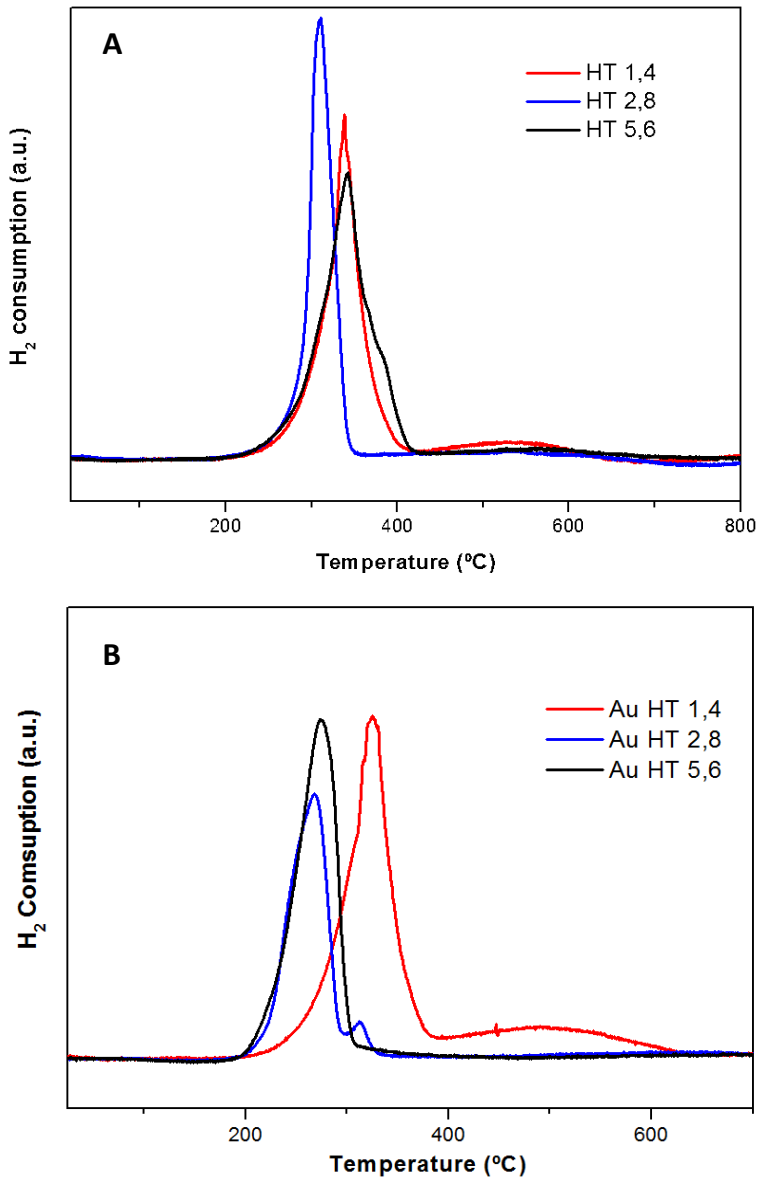

A
HT 1,4
HT 2,8
HT 5,6
H2 consumption (a.u.)
200
400
600
800
Temperature (ºC)
B
Au HT 1,4
Au HT 2,8
Au HT 5,6
H2 Comsuption (a.u.)
200
400
600
Temperature (ºC)

Figure 5

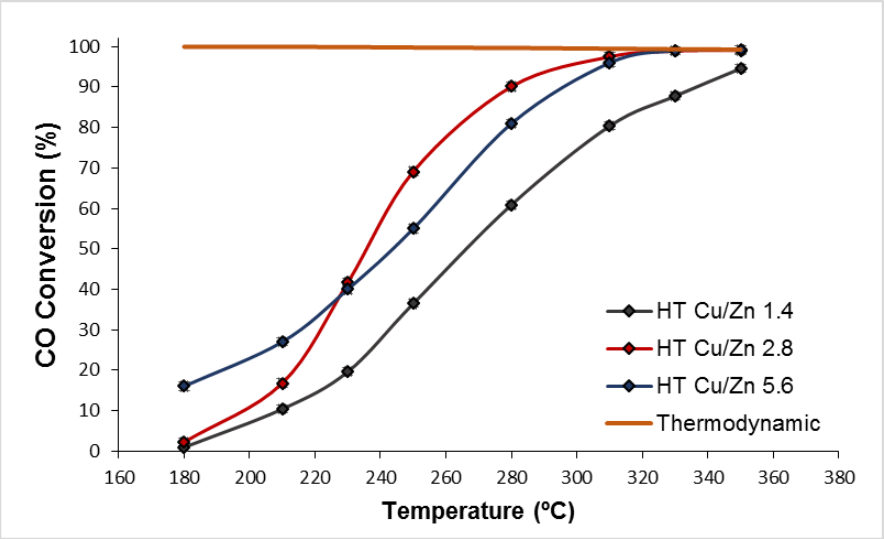

CO Conversion (%)
100
90
80
70
60
50
40
30
20
10
0
160
180
200
220
240
260
280
300
320
340
360
380
Temperature (ºC)
HT Cu/Zn 1.4
HT Cu/Zn 2.8
HT Cu/Zn 5.6
Thermodynamic

Figure 6

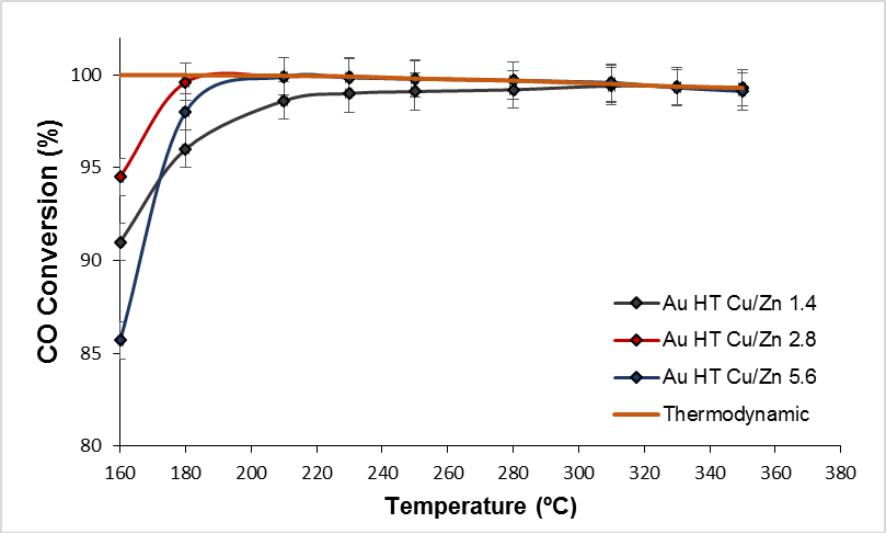

CO Conversion (%)
100
95
90
85
80
160
180
200
220
240
260
280
300
320
340
360
380
Temperature (ºC)
Au HT Cu/Zn 1.4
Au HT Cu/Zn 2.8
Au HT Cu/Zn 5.6
Thermodynamic

Figure 7

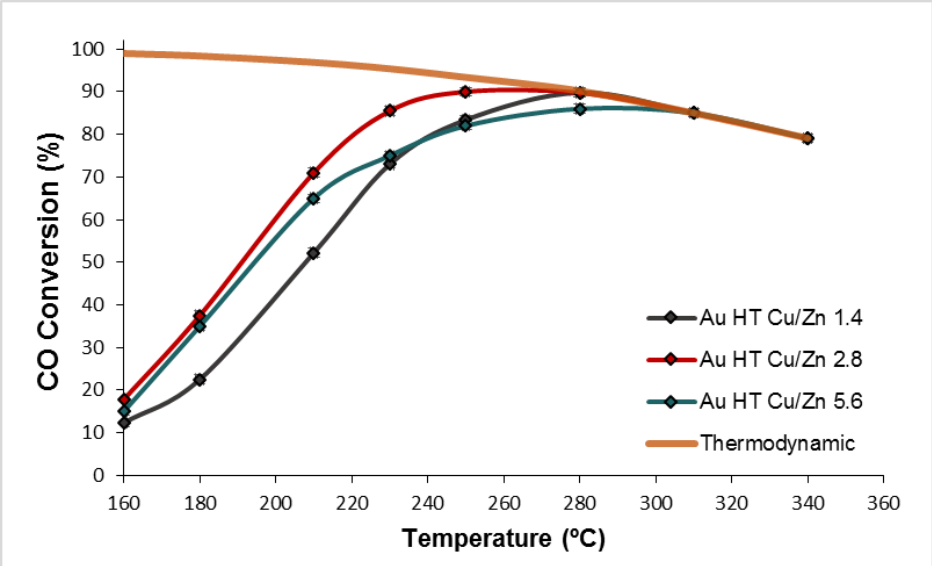

CO Conversion (%)
100
90
80
70
60
50
40
30
20
10
0
160
180
200
220
240
260
280
300
320
340
360
Temperature (ºC)
Au HT Cu/Zn 1.4
Au HT Cu/Zn 2.8
Au HT Cu/Zn 5.6
Thermodynamic

Figure 8

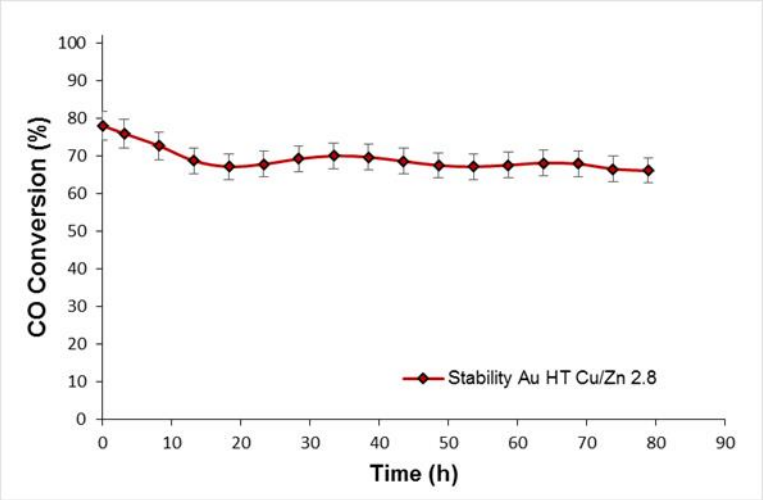
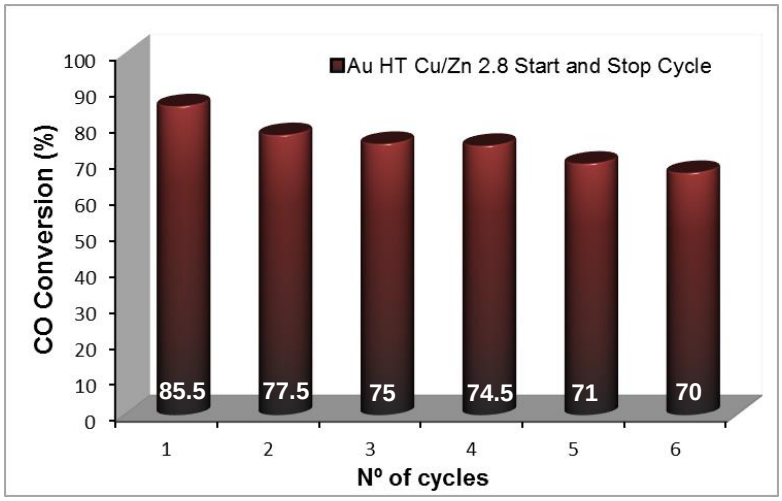

CO Conversion (%)
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
Time (h)
Stability Au HT Cu/Zn 2.8

Figure 9


Au HT Cu/Zn 2.8 Start and Stop Cycle
CO Conversion (%)
100
90
80
70
60
50
40
30
20
10
0
85.5
77.5
75
74.5
71
70
1
2
3
4
5
6
Nº of cycles