Supporting Information

Epitaxial-like Growth of Co_3O_4/ZnO Quasi-1D Nanocomposites

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FT-IR

FT-IR spectra were collected in transmittance mode by a Nexus 870 FT-IR apparatus in the range 350-4000 cm^{-1}. In each spectrum, the bare Si(100) contribution was subtracted.

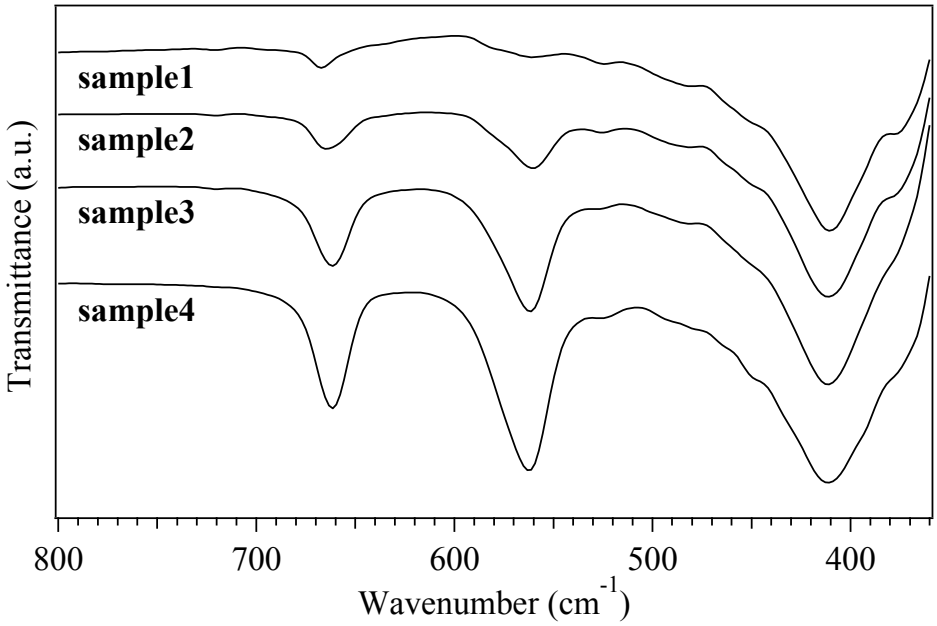

Figure SI1. FT-IR spectra of **samples1-4**. Spectra have been vertically shifted for clarity.

XPS

XPS and XE-AES measurements were run on a VersaProbe spectrometer from Physical Electronics, using a monochromated Al Kα X-ray source (hν = 1486.6 eV) at working pressures lower than 10^{-9} mbar. Binding energies (BEs, standard deviation = ± 0.2 eV) correction for charging was performed by assigning a value of 284.8 eV to the adventitious C1*s* line. Zn (α_{Zn}) and Co (α_{Co}) Auger parameters were calculated as previously reported.[S1,S2]

The presence of zinc(II) oxide in the investigated composites was confirmed by the shape and position (BE = 1021.7 eV) of the Zn2$p_{3/2}$ spin-orbit component, as well as by the zinc Auger parameter, whose value (α_{Zn} = 2010.1 eV) was in agreement with the one reported for pure ZnO.[S2,S3] The presence of Co_3O_4 was evidenced by Co2*p* peak positions [BE(Co2$p_{3/2}$) = 780.1 eV; BE(Co2$p_{1/2}$) = 795.4 eV; spin-orbit splitting = 15.3 eV], as well as by the low intensity of *shake-up* satellites.[S4,S5] Further evidence was provided by the cobalt Auger parameter, whose value (α_{Co} = 1552.2 eV) was in agreement with

literature data for Co_3O_4.[S5,S6] These results fully supported the formation of composite Co_3O_4/ZnO systems, excluding the presence of Co-Zn-O ternary phases.[S4,S5,S7]

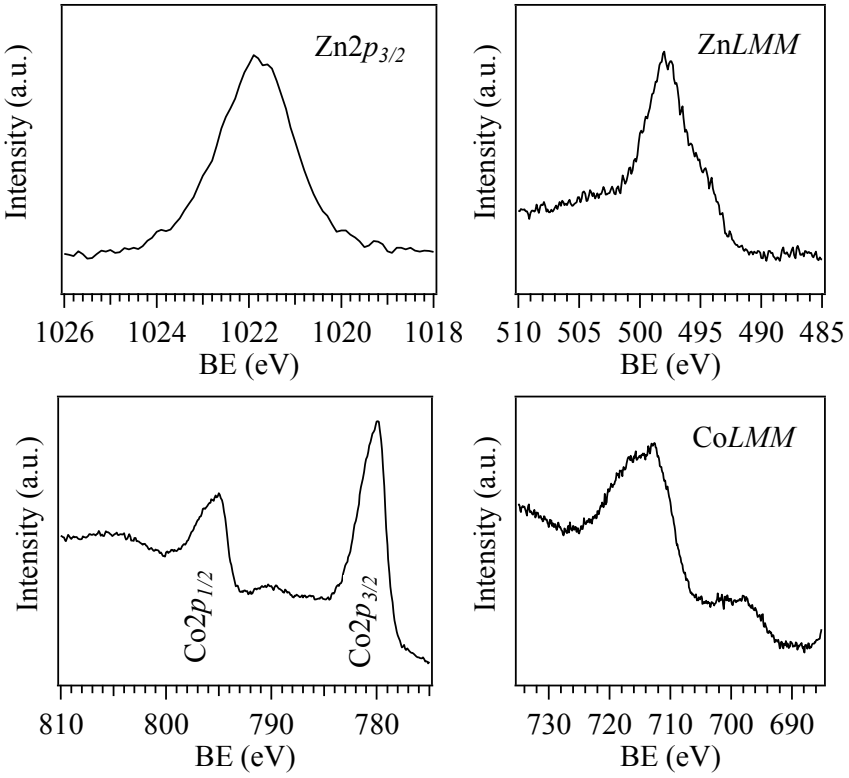

Figure SI2. Representative XPS and XE-AES surface peaks for zinc and cobalt taken from **sample4**.

N_{rings}	Co_3O_4 (cubic, *F*-43*m*)			ZnO (hexagonal, $P6_3mc$)		
	$d_{spacing}$	*hkl*	*I*	$d_{spacing}$	*hkl*	*I*
1	4.656	1 1 1	18.9	–	–	–
2	4.032	2 0 0	16.0	–	–	–
3	2.851	2 2 0	33.2	2.816	1 0 0	71.0
4	–	–	–	2.602	0 0 2	56.0
5	2.431	3 1 1	100.0	2.476	1 0 1	100.0
6	2.328	2 2 2	9.3	–	–	–
7	2.016	4 0 0	19.9	–	–	–
8	1.850	3 3 1	0.1	1.911	1 0 2	29.0
9	1.646	4 2 2	8.2	1.626	1 1 0	40.0
10	1.552	5 1 1	32.0	1.477	1 0 3	35.0
11	1.425	4 4 0	34.9	1.407	2 0 0	6.0
12	1.363	5 3 1	1.3	1.379	1 1 2	28.0
13	1.344	6 0 0	0.1	1.359	2 0 1	14.0
14	1.275	6 2 0	2.3	1.301	0 0 4	3.0
15	1.229	5 3 3	7.0	1.238	2 0 2	5.0
16	1.215	6 2 2	3.7	–	–	–
17	1.164	4 4 4	1.9	1.181	1 0 4	3.0
18	1.129	5 5 1	0.9	–	–	–
19	–	–	–	1.092	2 0 3	10.0
20	–	–	–	1.063	2 1 0	4.0
21	–	–	–	1.042	2 1 1	10.0
22	–	–	–	1.015	1 1 4	5.0
23	–	–	–	0.984	2 1 2	4.0
24	–	–	–	0.976	1 0 5	7.0
25	–	–	–	0.955	2 0 4	1.0
26	–	–	–	0.938	3 0 0	4.0
27	–	–	–	0.906	2 1 3	12.0
28	–	–	–	0.882	3 0 2	6.0
29	–	–	–	0.867	0 0 6	1.0
30	–	–	–	0.836	2 0 5	6.0
31	–	–	–	0.829	1 0 6	2.0
32	–	–	–	0.823	2 1 4	2.0
33	–	–	–	0.812	2 2 0	5.0

Table SI1. Reference structural values for Co_3O_4 and ZnO. For each *hkl* reflection, interplanar spacings ($d_{spacing}$ in Å) and the pertaining intensities are also provided. Data are taken from PDF#01-071-0816 and PDF#00-036-01451 cards.

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