High-Throughput Continuous Hydrothermal Synthesis of Transparent Conducting Aluminium and Gallium Co-doped Zinc Oxides

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SUPPLEMENTARY INFORMATION

Table S1. Electrical characterization information on AGZO samples synthesized by CHFS, including nominal atomic percentages of the metal ions in the precursor solutions.

Sample	Zn / at%	Al / at%	Ga / at%	Resistivity x 10^{-3} / Ω cm
$A_{0.5}G_{0.5}ZO$	99.0	0.5	0.5	32.5 ± 0.3
$A_{0.5}G_{1.5}ZO$	98.0	0.5	1.5	41.9 ± 0.4
$A_{1.0}G_{1.0}ZO$	98.0	1.0	1.0	33.9 ± 0.5
$A_{1.5}G_{0.5}ZO$	98.0	1.5	0.5	35.6 ± 0.4
$A_{0.5}G_{2.5}ZO$	97.0	0.5	2.5	11.4 ± 7.0
$A_{1.0}G_{2.0}ZO$	97.0	1.0	2.0	9.1 ± 3.6
$A_{1.5}G_{1.5}ZO$	97.0	1.5	1.5	31.9 ± 0.6
$A_{2.0}G_{1.0}ZO$	97.0	2.0	1.0	35.2 ± 0.4
$A_{2.5}G_{0.5}ZO$	97.0	2.5	0.5	50.5 ± 0.4
$A_{0.5}G_{3.5}ZO$	96.0	0.5	3.5	21.6 ± 0.3
$A_{1.0}G_{3.0}ZO$	96.0	1.0	3.0	16.2 ± 0.2
$A_{1.5}G_{2.5}ZO$	96.0	1.5	2.5	23.8 ± 0.6
$A_{2.0}G_{2.0}ZO$	96.0	2.0	2.0	9.3 ± 2.3
$A_{2.5}G_{1.5}ZO$	96.0	2.5	1.5	20.7 ± 8.1
$A_{3.0}G_{1.0}ZO$	96.0	3.0	1.0	9.4 ± 7.7
$A_{3.5}G_{0.5}ZO$	96.0	3.5	0.5	52.9 ± 0.3
$A_{0.5}G_{4.5}ZO$	95.0	0.5	4.5	43.4 ± 0.4
$A_{1.0}G_{4.0}ZO$	95.0	1.0	4.0	20.6 ± 0.1
$A_{1.5}G_{3.5}ZO$	95.0	1.5	3.5	20.7 ± 1.1
$A_{2.0}G_{3.0}ZO$	95.0	2.0	3.0	22.4 ± 3.2

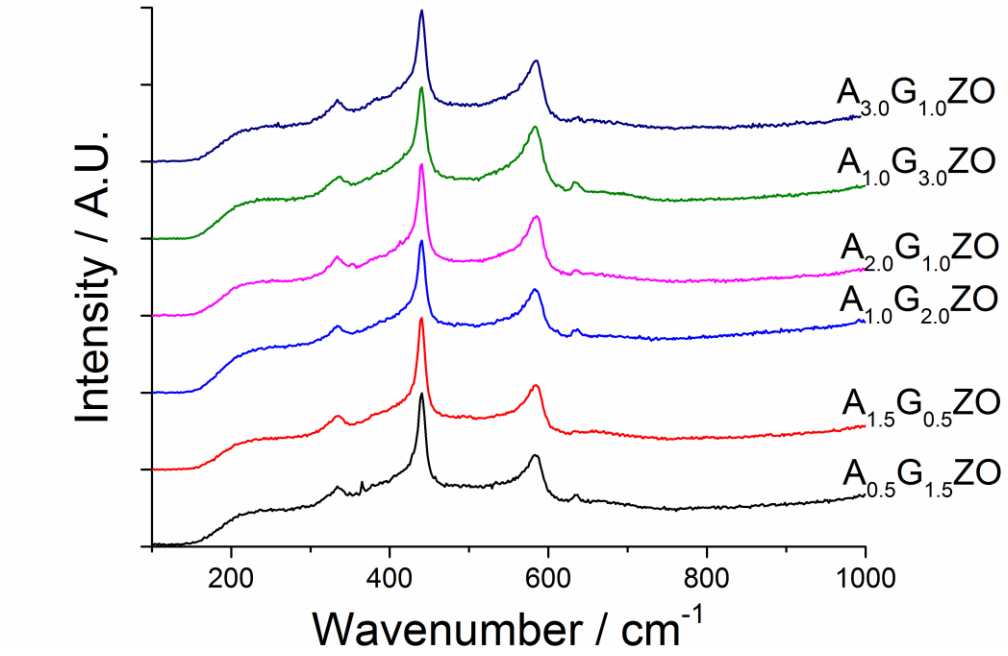

Figure S1. Raman spectra of the six representative AGZO samples. With regards to the observed dominating modes, the [E2 (high) – E2 (low)] mode of ZnO appeared at 331 cm^{-1}, the E2 high signal appeared at 438 cm^{-1}, the E1(LO) mode appeared at 581 cm^{-1} .[1] Additionally, a small peak appeared at 632 cm^{-1} , caused by the presence of Ga_2O_3(A_g mode).[2] This peak was observed more strongly for those samples with more gallium in the precursor solutions.

1. High- Damen, T. C.; Porto, S. P. S.; Tell, B. Raman effect in Zinc Oxide. *Physical Reviews* 1966, *142*, 570-574

2. Park, G.-S.; Choi, W.-B.; Kim, J.-M.; Choi, Y. C.; Lee, Y. H.; Lim, C.-B. Structural investigation of gallium oxide (beta- Ga_2O_3) nanowires grown by arc-discharge. *Journal of Crystal Growth* 2000, *220*, 494-500