Supplementary Information

Permanent photodoping of plasmonic gallium-ZnO nanocrystals

Anzelms Zukuls,[a] Raivis Eglītis,[a] Tanel Käämbre,[a,b] Reinis Ignatans,[c] Krišjānis Šmits,[d] Kristaps Rubenis,[e] Dzintars Zacs,[f] and Andris Šutka [a,b,*]

[a] *Research Laboratory of Functional Materials Technologies, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Paula Valdena 3/7, LV-1048 Riga, Latvia*
[b] *Institute of Physics, University of Tartu, Wilhelm Ostwald Str. 1, 50411, Tartu, Estonia*
[c] *Institute of Materials, École polytechnique fédérale de Lausanne, CH-1015 Lausanne, Switzerland*
[d] *Institute of Solid State Physics, University of Latvia, Kengaraga 8, LV-1063, Riga, Latvia*
[e] *Rudolfs Cimdins Riga Biomaterials Innovations and Development Centre of RTU, Institute of General Chemical Engineering, Faculty of Materials Science, Riga Technical University, Pulka 3, Riga, LV-1007, Latvia*
[f] *Institute of Food Safety, Animal Health and Environment "BIOR", Lejupes iela 3, Riga, LV-1076, Latvia*

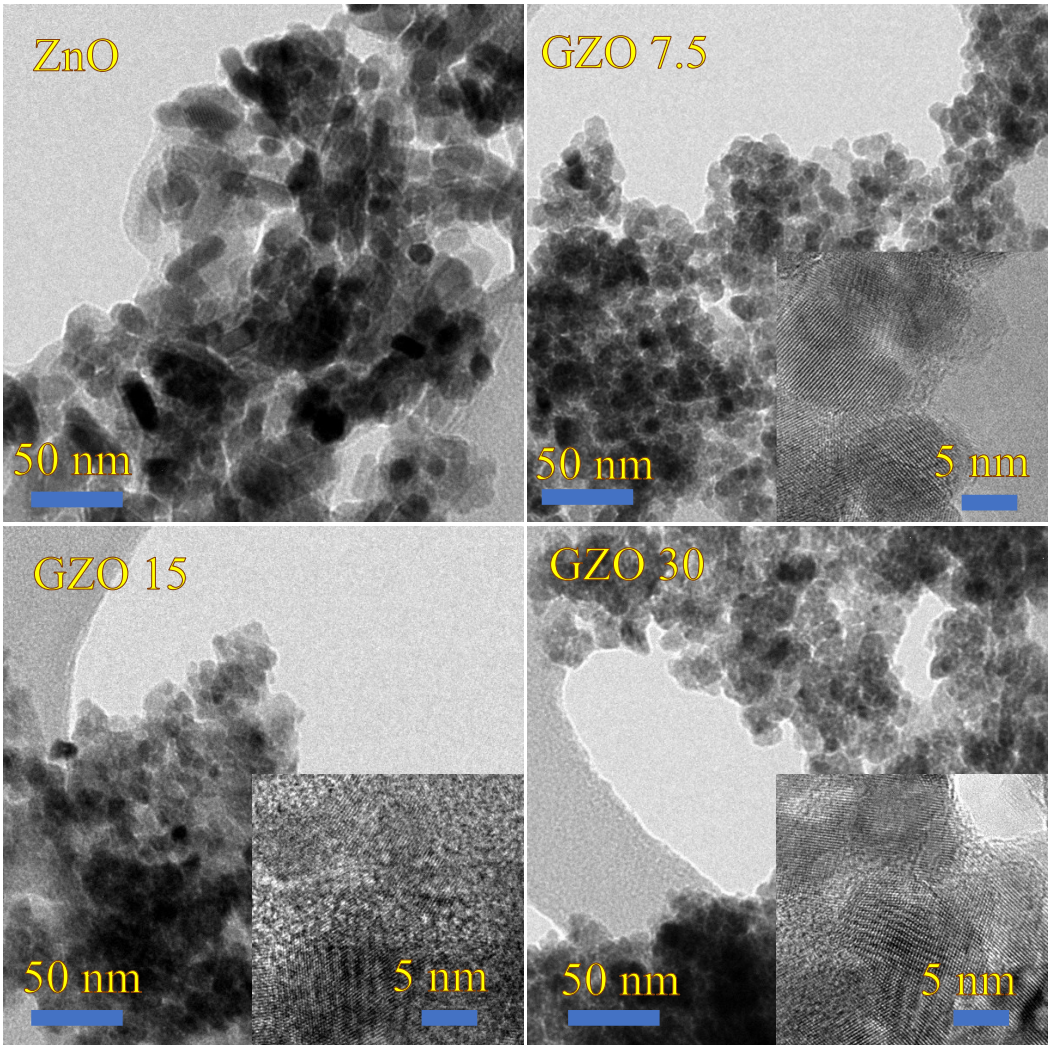


Fig. S1. Transmission electron microscopy images of ZnO and Ga doped samples

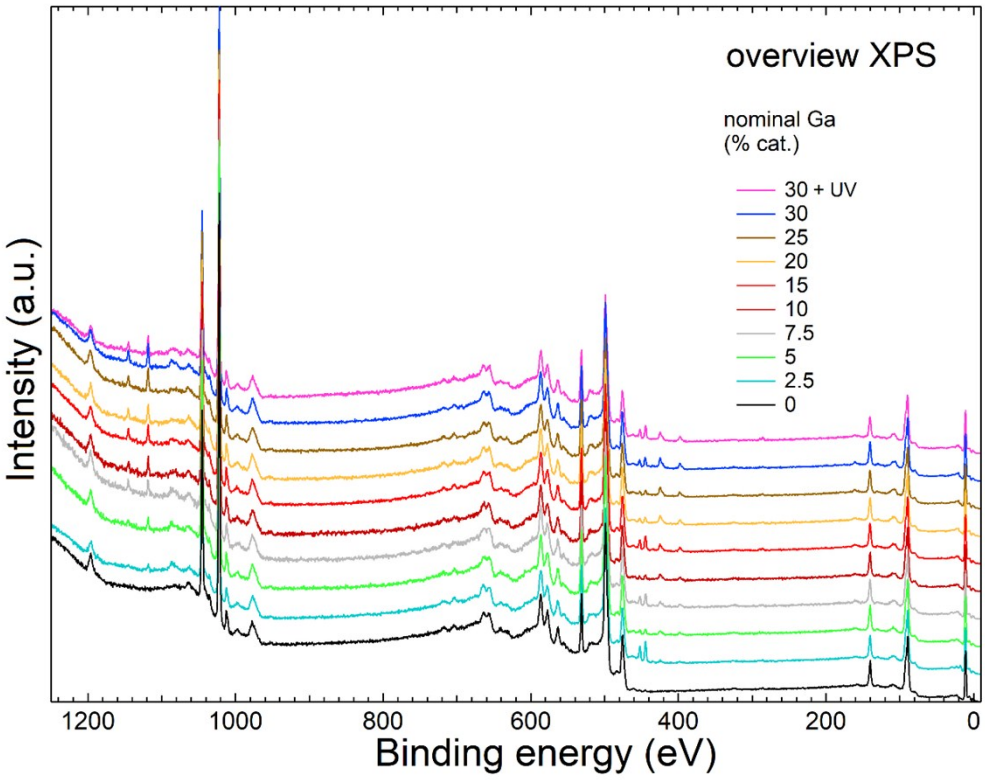


Fig. S2. Overview spectra for undoped and Ga doped ZnO samples.

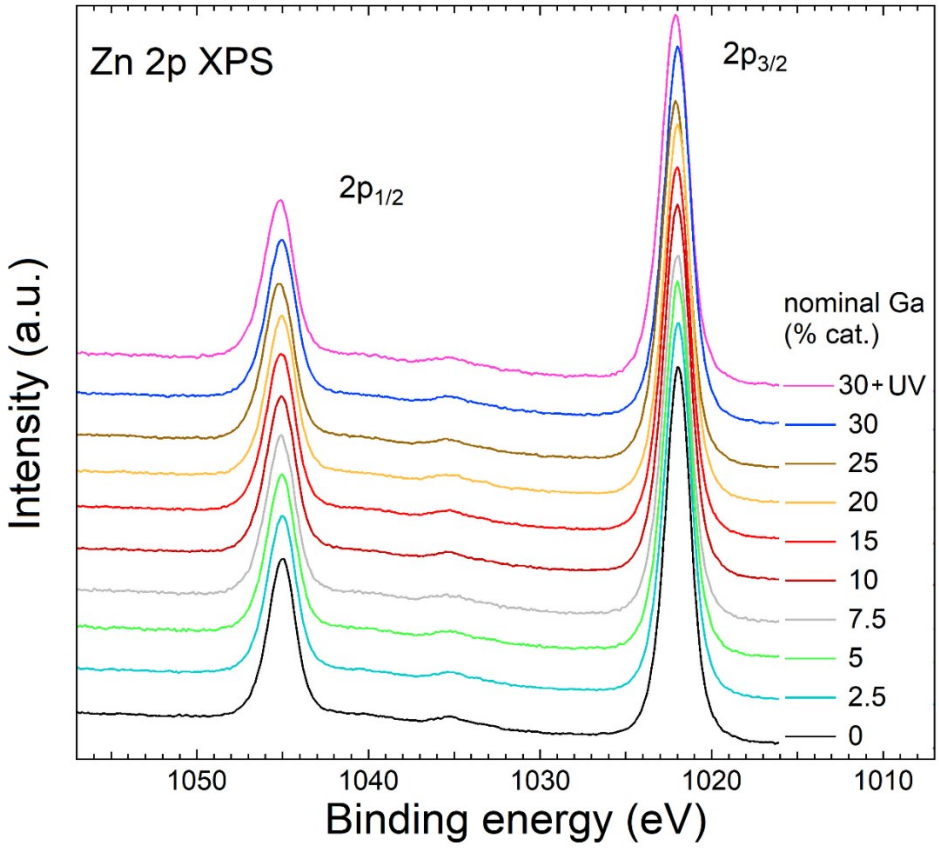


Fig. S3. Zn 2p spectra for undoped and Ga doped ZnO samples.

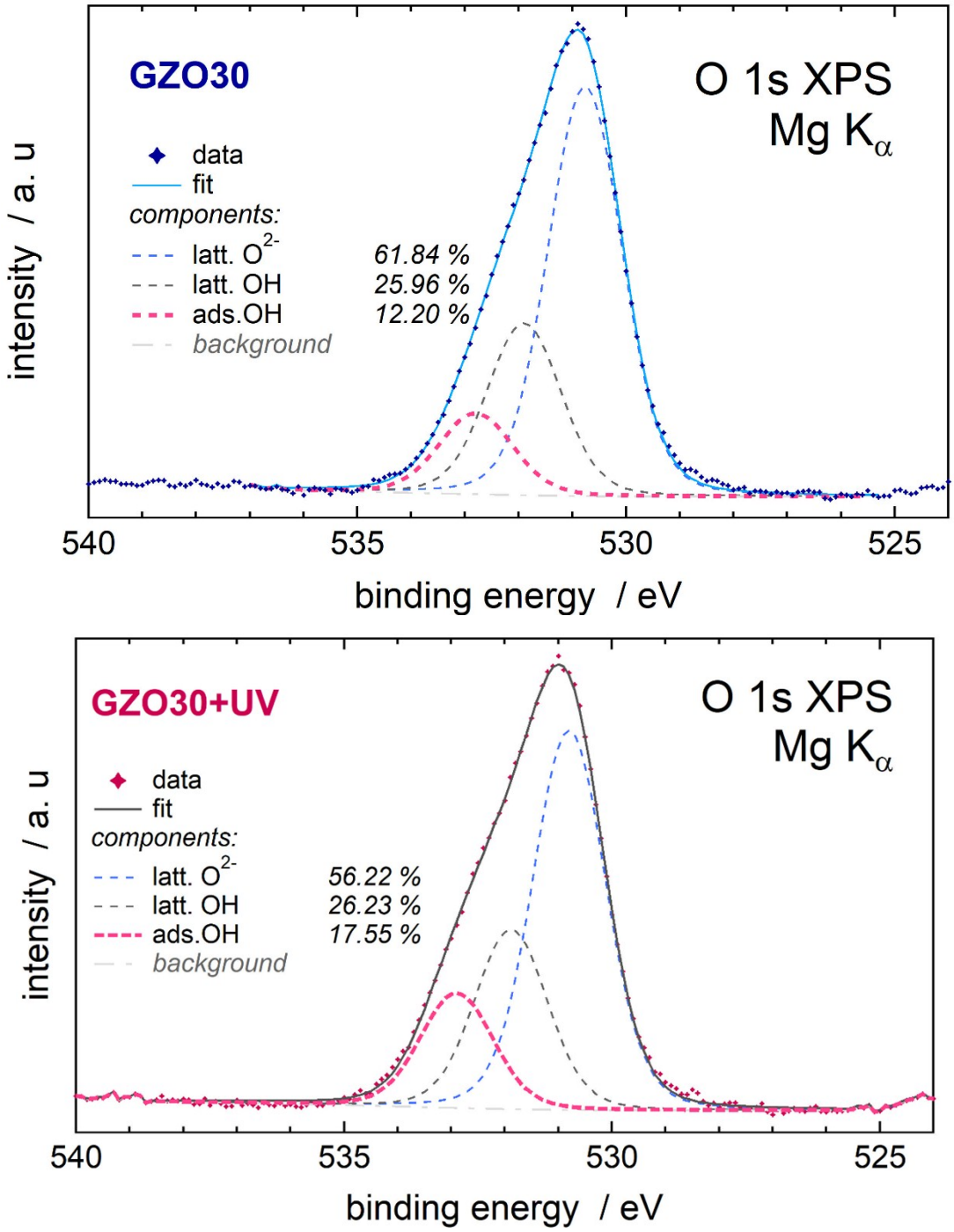


Fig. S4. O 1s spectrum of GZO 30 before and after UV irradiation in n-butanol

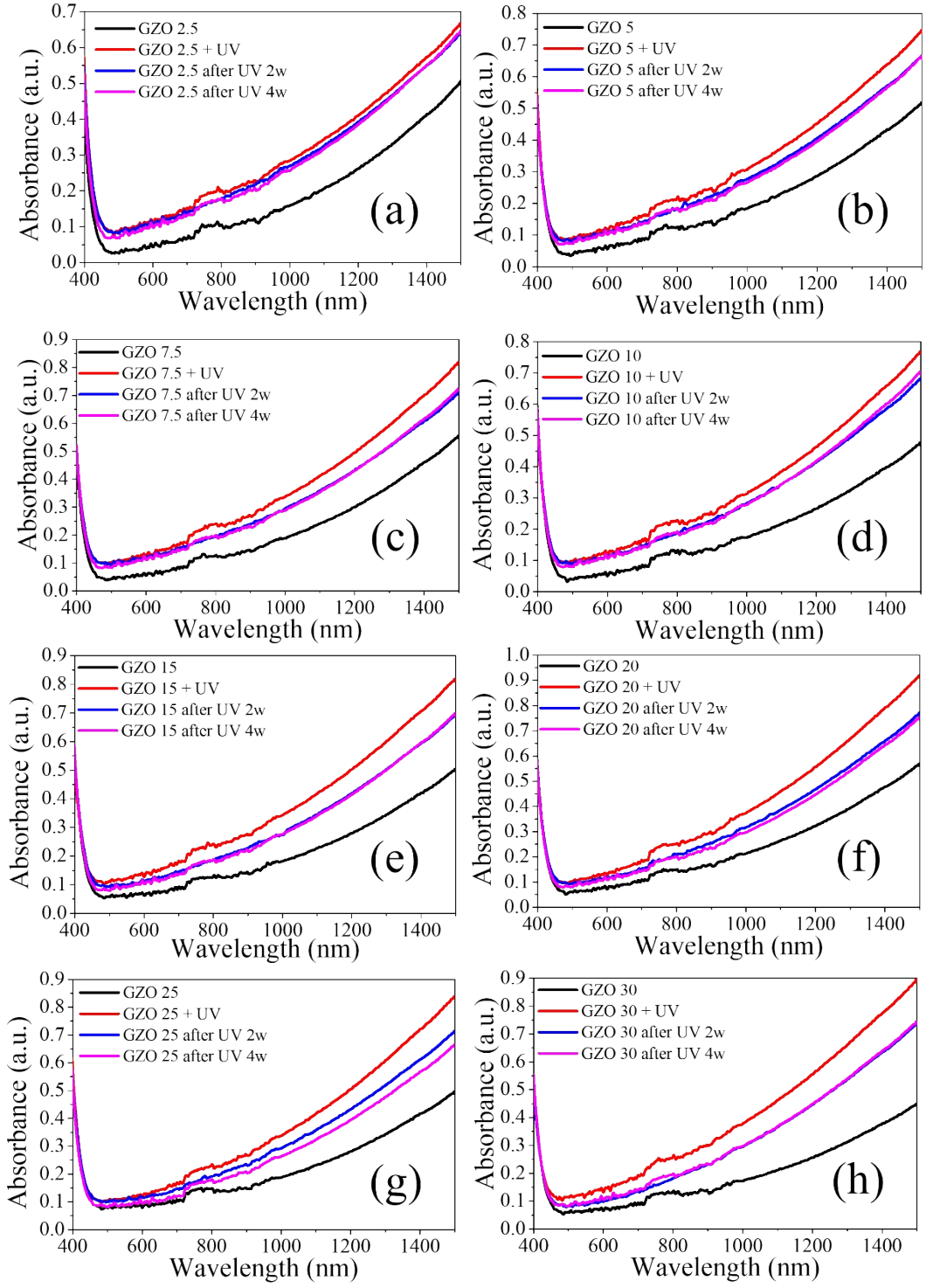


Fig. S5. UV-vis-NIR absorption spectra of various powder samples before and after 72 h photodoping. and relaxation after storing in air for 2 and 4 weeks.

Table S1. The band gap values for ZnO and GZO samples

Sample nominal Ga% (%)	Band gap
0	3.21
2.5	3.19
5	3.13
7.5	3.18
10	3.16
15	3.16
20	3.13
25	3.13
30	3.13

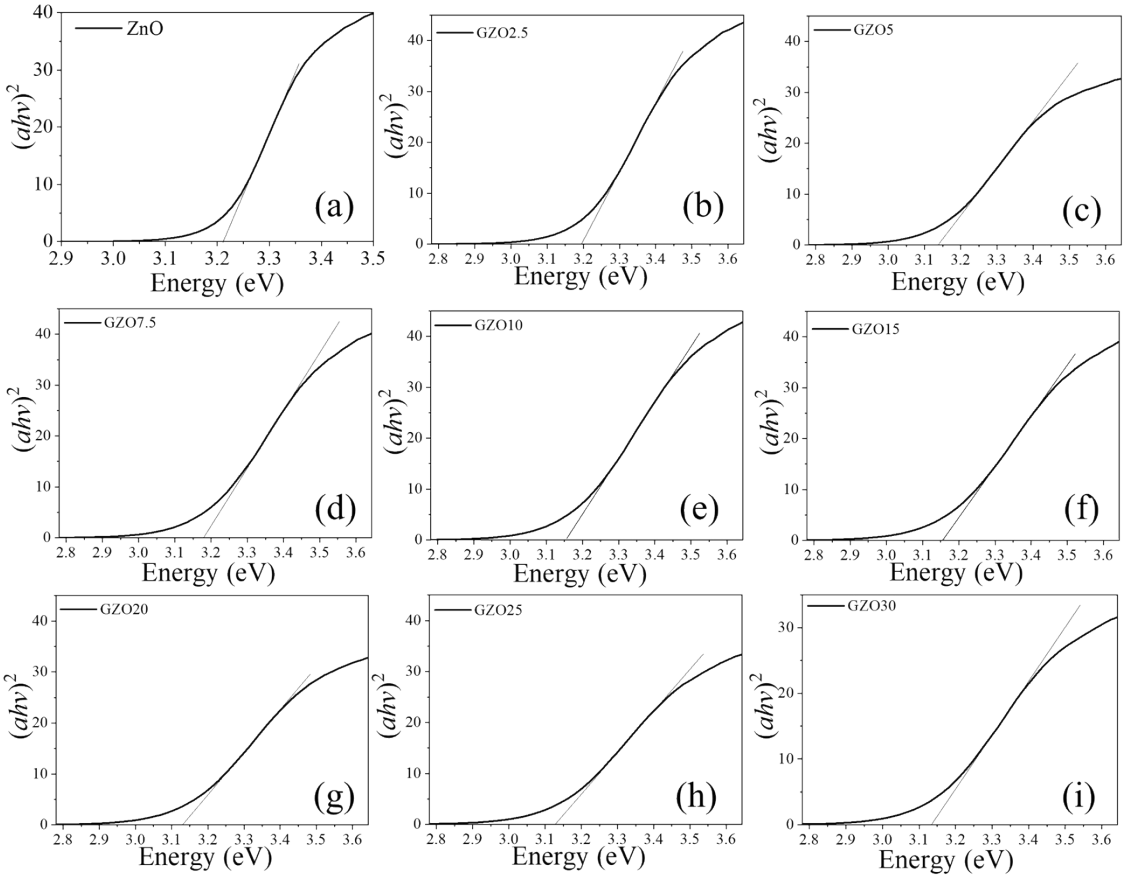


Fig. S6. $(\alpha h\nu)^2$ versus energy for ZnO and Ga doped samples.

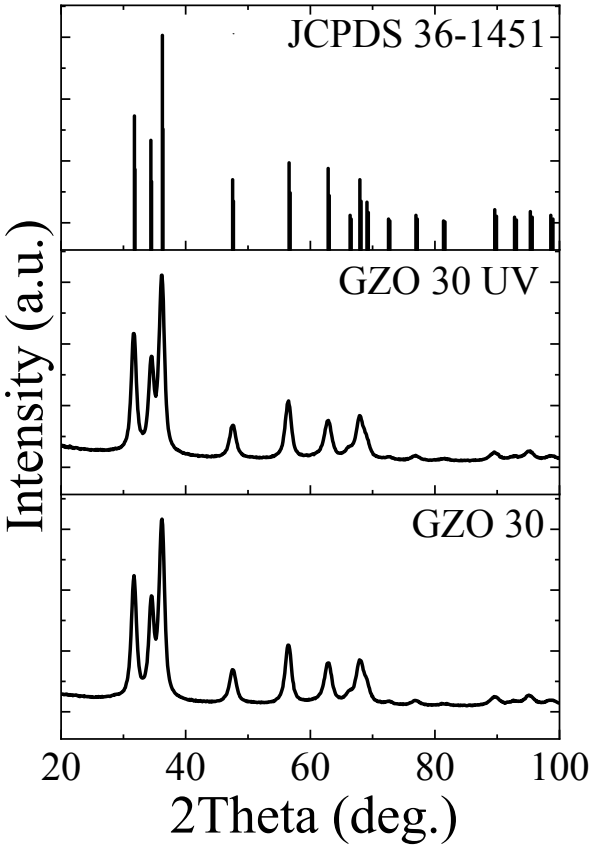


Fig. S7. XRD for GZO 30 and GZO 30 UV samples.

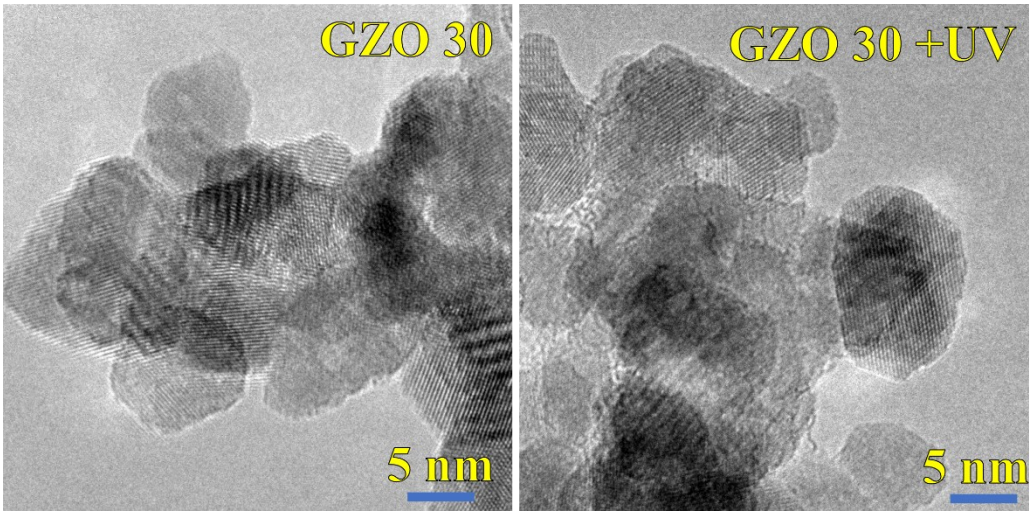
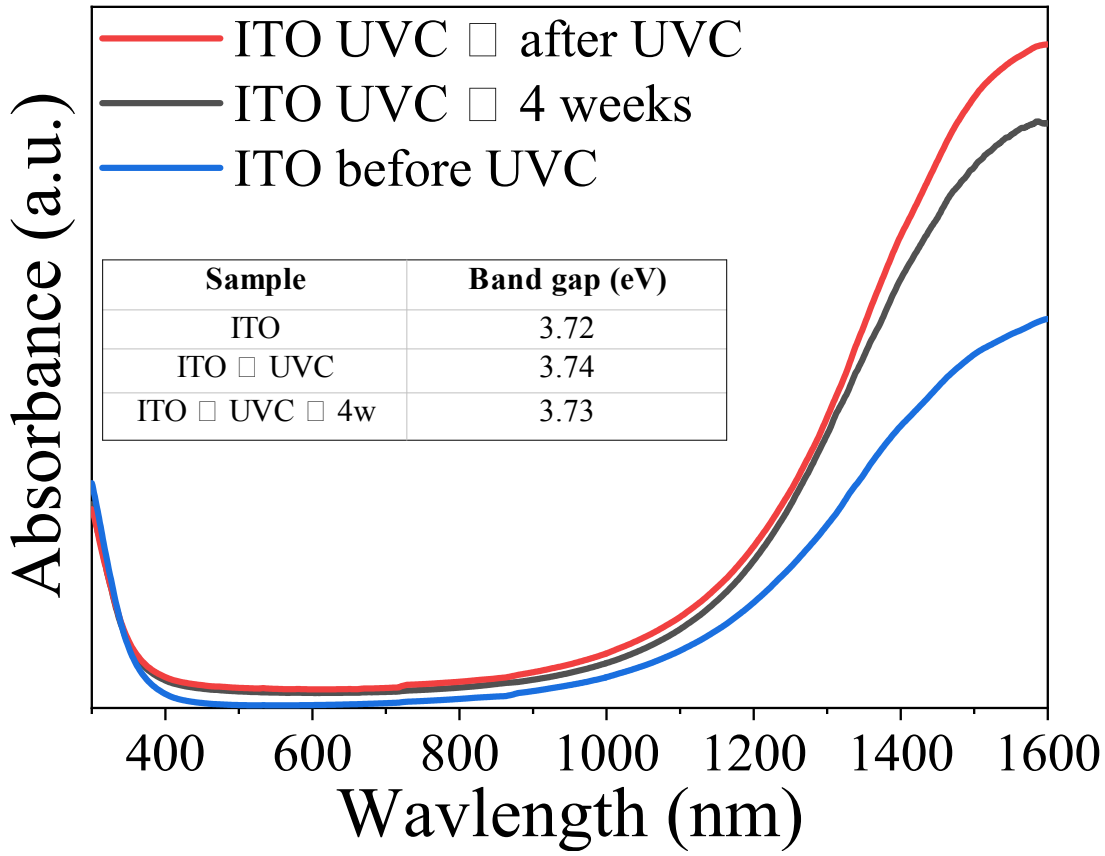


Fig. S8. TEM images for GZO 30 samples before (GZO 30) and after UV (GZO 30 +UV) irradiation.

Table S2. ICP-MS measurements for supernatants after synthesis and before UV irradiation

	23 Na	66 Zn	71 Ga	23 Na	66 Zn	71 Ga
	mg/L			% from synthesis solution		
Synthesis solution	4901	9.32	103	100	100	100
n-butanol supernatant	4.94	0.223	0.018	0.10	2.39	0.02



Sample	Band gap (eV)
ITO	3.72
ITO □ UVC	3.74
ITO □ UVC □ 4w	3.73

Fig. S9. UV-vis-NIR absorption spectra of indium doped tin oxide (ITO) nanopowder (particle size 30 nm) from Sigma-Aldrich before, after and 4 weeks after UVC photodoping.