Supplementary Materials

The ZnO-In_2O_3 oxide system as a material for low-temperature deposition of transparent electrodes

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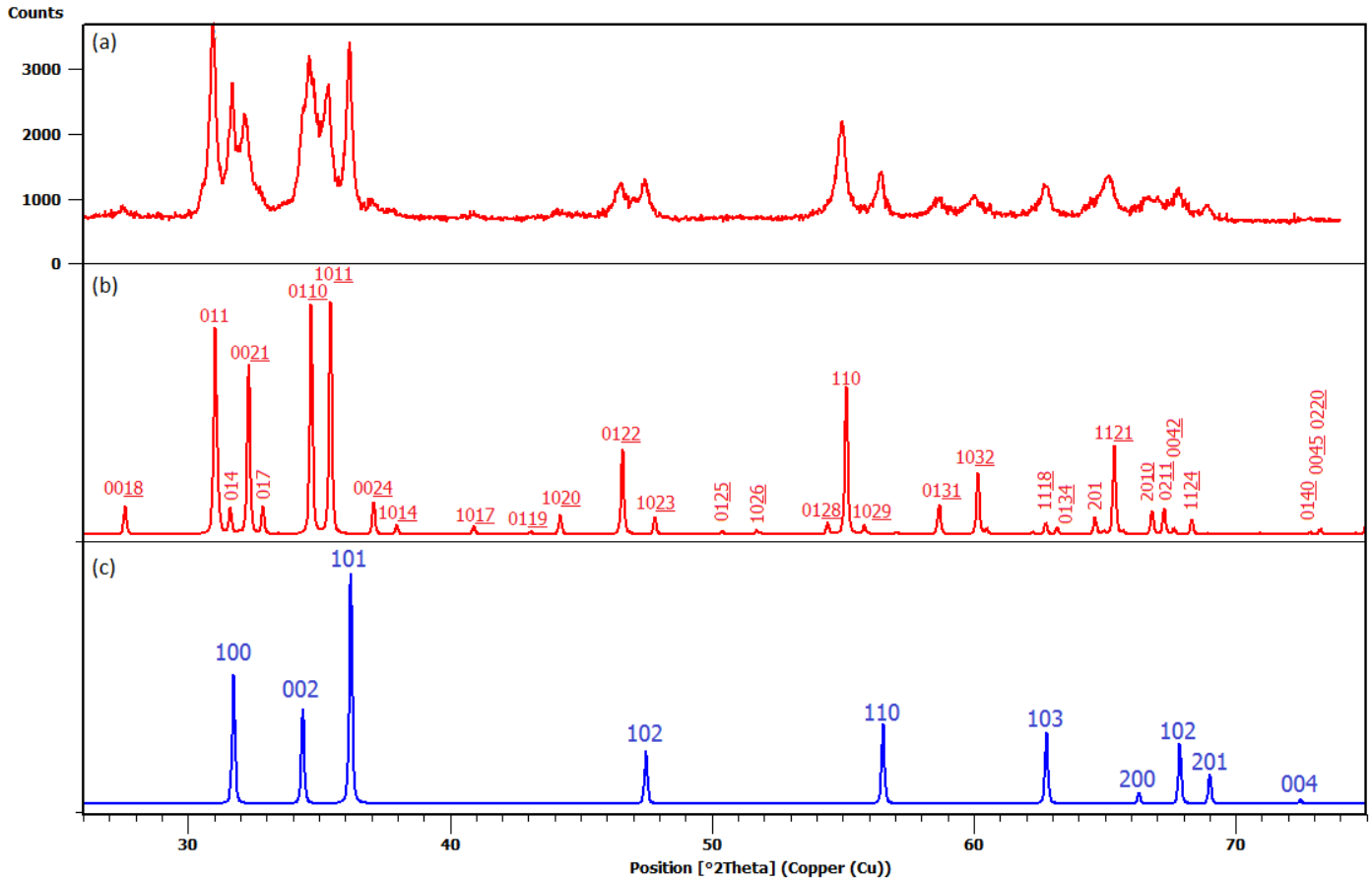

Figure S1. The experimental XRD spectrum for the SPS-formed 90.0 mol% ZnO + 10.0 mol% In_2O_3 ceramic sample (a); the simulated XRD spectrum for a well-crystallized $In_2Zn_5O_8$ hexagonal phase according to the JCPDS 01-089-8974 pattern card (b); the simulated XRD spectrum for a well-crystallized ZnO hexagonal phase according to the JCPDS 00-036-1451 pattern card (c).

The simulation procedure was performed by using the HighScore Plus software. The figure S1 clearly shows that the sintered ceramic sample contains two phases - ZnO and $In_2Zn_5O_8$.

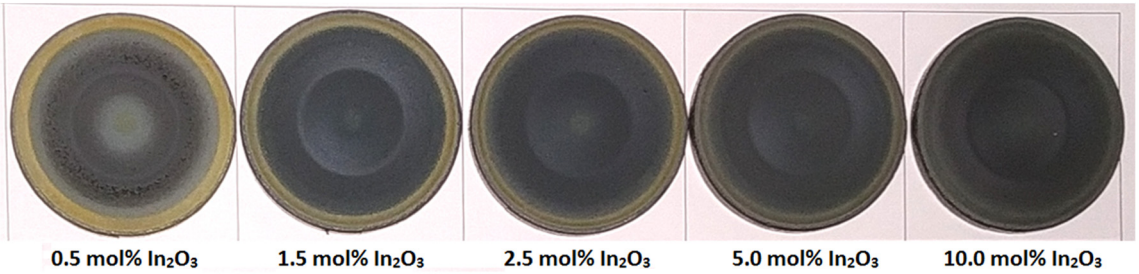

Figure S2. A top view photography showing the appearance of ZnO-$InO_{1.5}$ targets subjected to more than 3 hours of sputtering processes.

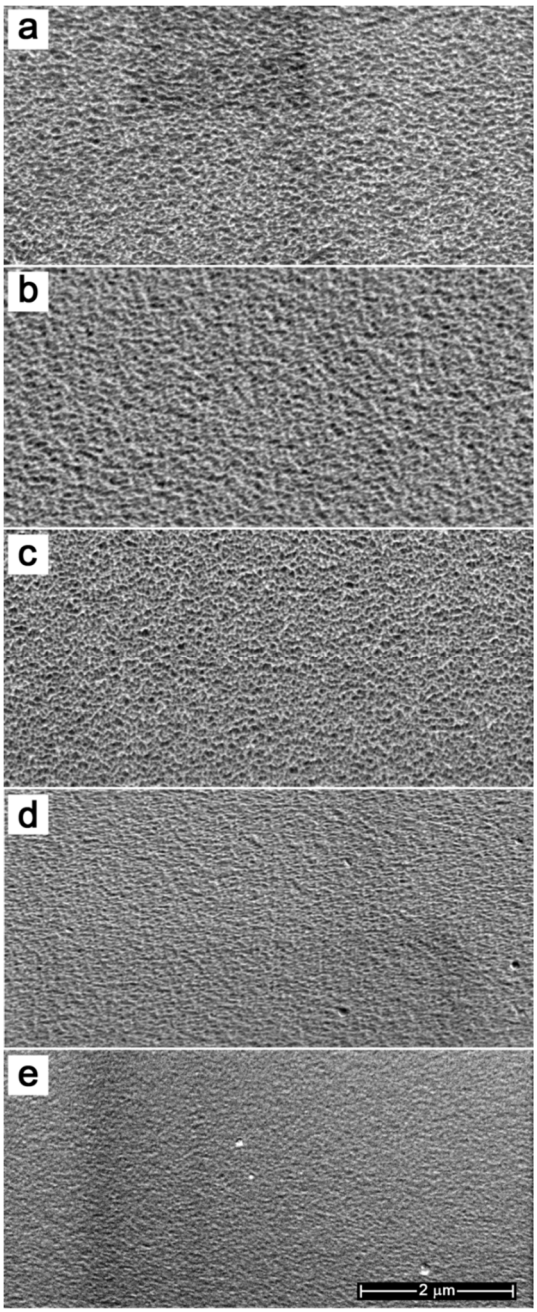

Figure S3. SEM micrographs of top view showing the surface morphology of ZIO films deposited by using SPS synthesized ceramic targets with various In_2O_3 content: a – 0.5 mol%, b – 1.5 mol%, c – 2.5 mol%, d – 5.0 mol% and e – 10.0 mol%.

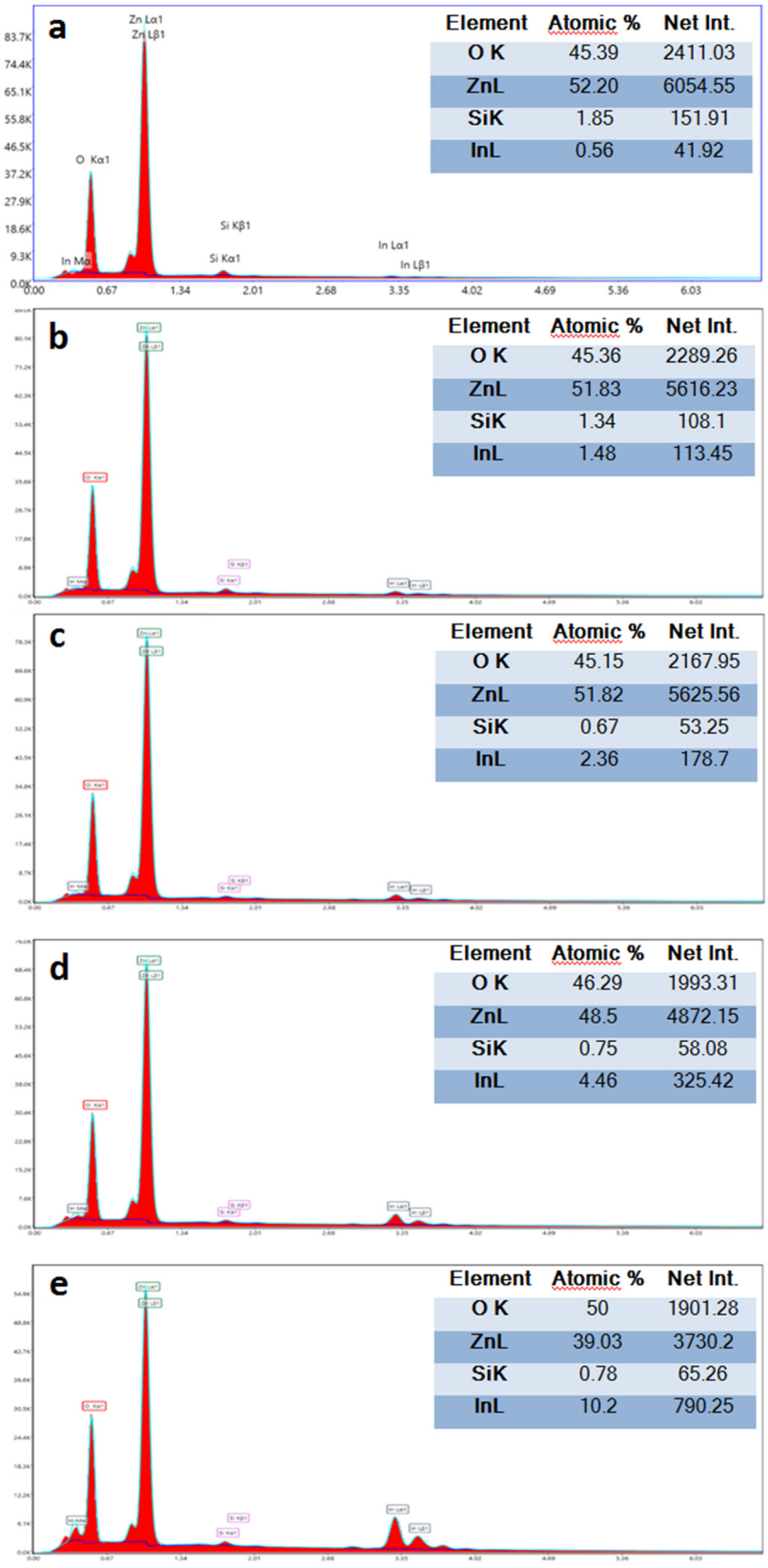

Figure S4. EDX spectra for ZIO thin films deposited by using the targets with various In_2O_3 content: a – 0.5 mol%, b – 1.5 mol%, c – 2.5 mol%, d – 5.0 mol% and e – 10.0 mol%. Insets show quantitative data on the elemental composition calculated by the eZAF Smart Quant method. The K-lines for Si present in the spectra came from the substrate.

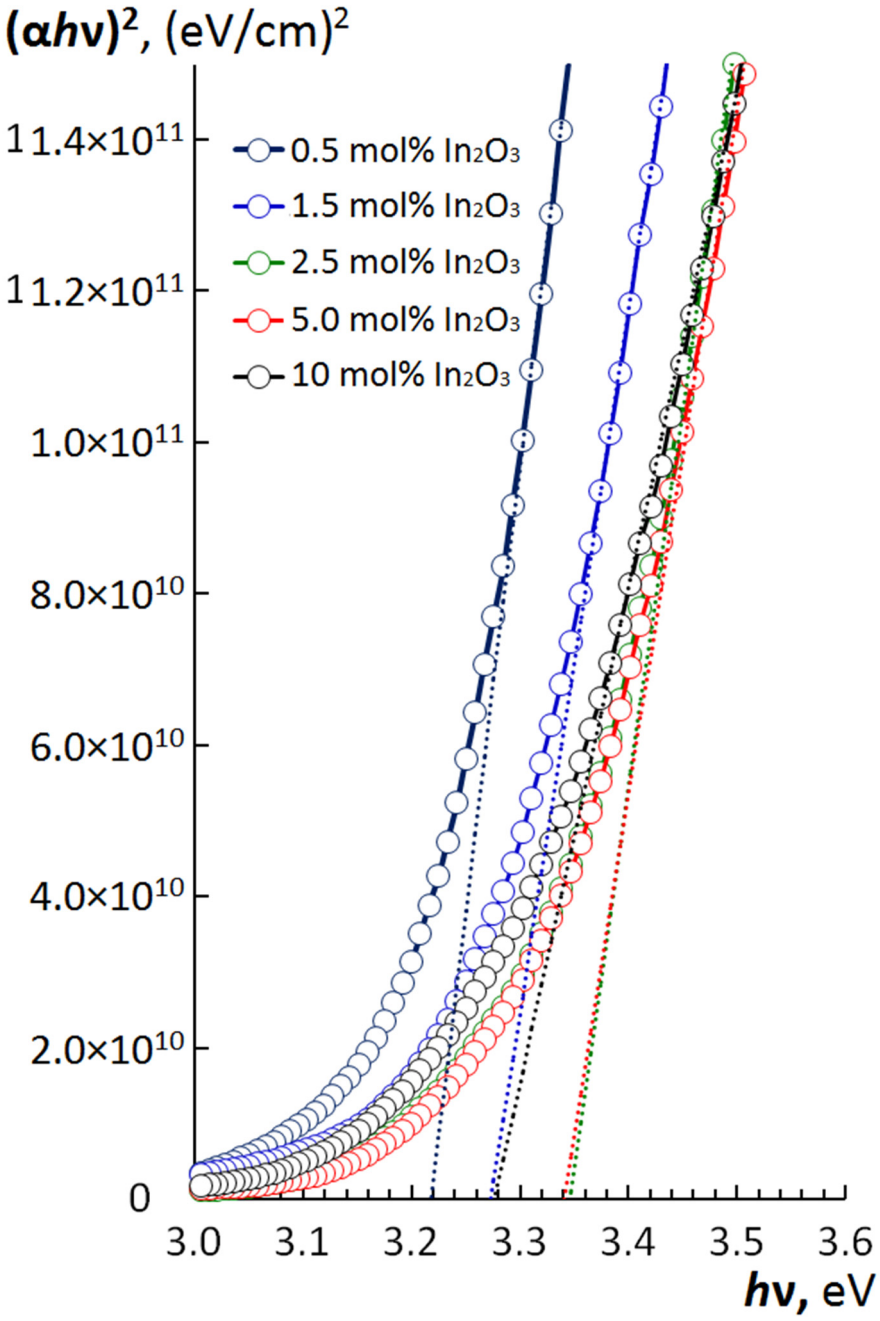

Figure S5. Tauc's graphs of ZIO thin films deposited by using the targets with various In_2O_3 content.