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Solution-processed Gallium Zinc Oxide for Inverted Organic Photovoltaics ALISHA HUMPHRIES, University of Denver, DANA OLSON, JOSEPH BERRY, DAVID GINLEY, National Renewable Energy Laboratory, SEAN SHAHEEN, University of Denver, NREL COLLABORATION — Organic photovoltaics (OPV) is an emerging technology with the promise of inexpensive and scalable solar power harvesting. Inverted devices typically exhibit somewhat lower efficiencies than standard OPVs, therefore this study focused on improving performances of inverted devices through gallium doping of the electron-transport layer, zinc oxide (ZnO). Introducing an n-type dopant into ZnO films is expected to increase the carrier concentration and band-bending in devices for improved charge collection. In this study, gallium zinc oxide (GZO) was fabricated through 0-20 wt. % doping levels. Carrier concentrations were successfully increased as shown by conductivity measurements made on GZO films. X-ray diffraction shows GZO is converted to a crystalline oxide at higher temperatures. Crystalline GZO films show promise for improving power conversion efficiencies of OPV devices, however high temperatures are necessary and may introduce the need for an alternative transparent conducting oxide underlying the electron transport layer.

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