

Short Communication

## A Comparative Study on Low-Temperature Sol-Gel Ga-Doped Zinc Oxide Inverted PSCs

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A low-temperature sol-gel Ga-doped ZnO (ZnO:Ga) thin film as the electron transport layer (ETL) for high efficiency inverted polymer solar cells (PSCs) has been realised. The ZnO:Ga precursor was prepared by dissolving zinc acetate and ethanolamine in the 2-methoxyethanol with Ga(NO<sub>3</sub>)<sub>3</sub> at different concentration. Doped ZnO thin films were deposited on indium tin oxide (ITO)/glass substrates by spin-coating technique and the films annealed at 150°C for 5 minutes in air. To check performances of ZnO:Ga thin film were realized inverted polymer solar cells with the configuration ITO/ZnO:Ga/photoactive layer/MoO<sub>3</sub>/Ag. The photoactive layer was a blend of poly[(4,8-bis-(2-ethylhexyloxy)-benzo(1,2-b:4,5-b')dithiophene)-2,6-diyl-alt-(4-(2-octanoyl)-3-fluorothieno[3,4-b]thiophene)-2,6-diyl)] (PBDTTT-CF) and [6,6]-phenyl C<sub>71</sub> butyric acid methyl ester ([70]PCBM) (1:1.5 w/w). In this work was investigated the effect of gallium concentration on the photovoltaic behavior of PSCs. The best efficiency of 7.7% was reached by using a 6 at% ZnO:Ga film as ETL.

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**Keywords:** polymer solar cells, gallium doped zinc oxide (ZnO:Ga), sol-gel.

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