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## Erbium (III) tris(8-hydroxyquinoline) doped zinc oxide interfacial layer for improved performance of polymer solar cells

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**Abstract:** Erbium (III) tris(8-hydroxyquinoline) ErQ complex is emerging as a class of novel luminescent material for interfacial engineering to improve the performance of organic solar cells (OSCs). In the present work, ErQ doped ZnO solution has successfully been prepared by the sol-gel route at room temperature as an electron transport layer for high efficient OSCs. The modified ErQ:ZnO films can yield not only higher electron mobility, good surface quality by the passivation of ZnO defects, but also slightly higher work-function and thereby shortening in the leakage current, which subsequently enhanced power conversion efficiency (PCE). As a result, the remarkable PCE increasing from 3.62 % to 4.26 % for poly(3-hexylthiophene):phenyl-C61-butyric acid methyl ester (P3HT:PC<sub>61</sub>BM) and from 6.84 % to 7.95 % for polymer thieno [3,4-b] thiophene/benzodithiophene: [6,6] phenyl-C<sub>71</sub>-butyric acid methyl ester (PTB7:PCB<sub>71</sub>M) devices could be achieved upon an incorporating ErQ:ZnO interfacial layer.

**Keywords:** Organic solar cells; P3HT:PC<sub>61</sub>BM; PTB7:PC<sub>71</sub>BM; PL; XPS; AFM

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