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High Efficiency Alternative Current Driven Organic Light Emitting Device JUNWEI XU, GREGORY SMITH, CHAOCHAO DUN, DAVID CARROLL, Center for Nanotechnology and Molecular Materials, Department of Physics, Wake Forest University, CENTER FOR NANOTECHNOLOGY AND MOLECULAR MATERIALS TEAM — In this work, we introduce the use of field-activated organic light emitter, coupled with a semiconducting gate electrode to create a novel, highly efficient lighting device. A layer of ZnO nanoparticles between the interface of an ITO contact and a PEDOT:PSS injection layer facilitates impressive control over the capacitive characteristics of the device. The advanced capacitive behavior of our devices gives rise to a barrier for carrier injection at low frequencies. Conversely, it promotes the generation of a field-induced polarization current in the active layer at high frequencies. The alternative current driven organic light emitting device obtains the power efficiency over 300 lm/W A at >500 cd/m2, which is the highest power efficiency to date among high-luminance organic light emitting devices, to the best of the authors' knowledge. We interpret these findings as the negative magnetoresistance induces the 'secondary' carriers that would contribute to light.

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