Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

High Efficiency Alternating Current Driven Organic Light Emitting Devices Employing Active Semiconducting Gate Layers GREGORY SMITH, JUNWEI XU, DAVID CARROLL, Wake Forest University — In this work, we describe the role of semiconductor-polymer interfaces in alternating current (AC) driven organic electroluminescent (EL) devices. We implement inorganic semiconducting materials between the external contact and the active layers in organic light EL devices. Precise control of capacitance and charge injection is required to realize bright and efficient large area AC driven devices. We show how this architecture results in active gating to the polymer layers, resulting in the novel ability to control the capacitance and charge injection characteristics. We propose a model based on band bending at the semiconductor-polymer interface. Furthermore, we elucidate the influence of the semiconductor-polymer interface on the internally coupled magnetic field generated in an alternating current driven organic light emitting device configuration. Magnetic fields can alter the ratios of singlet and triplet populations, and we show that internal generation of a magnetic field can dramatically alter the efficiency of light emission in organic EL devices.

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Date submitted: 14 Nov 2014 Electronic form version 1.4