Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Highly Efficient Blue Electroluminescence from n-Type Conjugated Oligoquinolines ABHISHEK KULKARNI, ANGELA GIFFORD, CHRISTOPHER TONZOLA, SAMSON JENEKHE, Departments of Chemical Engineering and of Chemistry, University of Washington, Seattle, WA 98195 —
Achievement of blue electroluminescence (EL) with high efficiency, color purity and stability remains a challenge for full-color organic light-emitting diode (OLED) based displays. A series of n-type, thermally robust (glass transition temperature T_g > 130 $^\circ$C) oligoquinolines based on the 6,6'-bis(4-phenylquinoline) core has been synthesized and used as emissive and electron transport materials for blue OLEDs. Simple bilayer diodes gave stable blue EL with CIE coordinates at (0.15, 0.16), maximum luminance of 4000 cd/m^2 and luminous efficiency of 7.9 cd/A (at 945 cd/m^2). These results represent one of the best blue OLED performances reported to date from non-doped, fluorescent organic emitters. The high T_gs render the amorphous oligoquinoline films very stable with excellent EL spectral stability. These results demonstrate that oligoquinolines are promising blue emitters and electron transport materials for developing high-efficiency OLEDs with a simple architecture.

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Date submitted: 01 Dec 2004 Electronic form version 1.4