Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Temperature Dependent Electroluminescence of Alq_3 Based OLEDs AJITH DESILVA, H. P. WAGNER, Deptartmet of Physics, University of Cincinnati, OH 45221, R. A. JONES, W. LI, A. STEKL, Deptartment of ECECS, University of Cincinnati, Cincinnati OH 45221 — The temperature dependent I-V characteristics and electroluminescence (EL) of an ITO/PEDOT/NPD/Alq_3/LiF–Al OLED is investigated. The I-V measurements reveal a trap charge limited current behavior with characteristic trap energy of 53 meV. The EL of the device is compared with the photoluminescence (PL) of a 50 nm thick Alq_3 film on Si (001) in the range from 10 to 320 K. The EL efficiency of the device shows similar temperature dependence as the PL intensity obtained from the Alq_3 film. The OLED brightness saturates at 10,000 cd/m^2 (T = 300 K; V = 15 V). For a constant forward bias (8 V) the maximum EL efficiency of the device is 2.2 cd/A obtained at 180 K. The maximum PL efficiency of the Alq_3 film is observed at the same temperature (180 K). Furthermore, both the EL and PL spectra reveal a maximum redshift at 180 K which is tentatively attributed to the formation of self-trapped excitons within the Alq_3layer.

Ajith DeSilva
Dept of Physics, University of Cincinnati

Date submitted: 30 Nov 2005 Electronic form version 1.4