Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Enhanced and Tailored Emission from Luminescent Three-Dimensional Ru(bpy)$_3$(PF$_6$)$_2$ Inverse-Opal Photonic Crystals ANDREW BRZEZINSKI, JYH-TSUNG LEE, University of Illinois at Urbana-Champaign, JASON SLINKER, Cornell University, Ithaca, NY, PIERRE WILTZIUS, University of Illinois at Urbana-Champaign, GEORGE MALLIARAS, Cornell University, Ithaca, NY, PAUL BRAUN, University of Illinois at Urbana-Champaign — Three-dimensional inverse opal structures, with various lattice constants are made by infilling polystyrene colloid templates with luminescent Ru(bpy)$_3$(PF$_6$)$_2$. The passive photoluminescent structures and active electroluminescent organic light-emitting-diode structures were characterized via electron microscopy and solid-angle-resolved spectroscopy. A model is presented, explaining light propagation within and emission from the crystal. Results show angular emission profiles are tailored by choice of lattice constant, which determines directions inside the crystal for which propagation of frequencies emitted from Ru(bpy)$_3$(PF$_6$)$_2$ are either enhanced or suppressed. Enhanced emissive flux is achieved by suppressing propagation in near parallel directions relative to the air interface.

Pierre Wiltzius
University of Illinois at Urbana-Champaign

Date submitted: 20 Nov 2006 Electronic form version 1.4