

RSoft Application: OLED With Moth-Eye Coating

Increasing OLED Extraction Efficiency With Micro-Scale Textures

Overview

An OLED manufacturer in Asia needed to increase the extraction efficiency of a green back-emitting OLED using micro-scale textures.

The Challenge

Stringent power constraints required the development of an OLED device with a nanoscale, moth-eye pattern on the glass-to-air interface to maximize light extraction efficiency. OLED devices are typically simulated with ray tracing tools, which cannot include the subwavelength feature sizes of a moth-eye pattern. The RSoft™ DiffractMOD™ and FullWAVE™ tools are ideal solutions for this design challenge.

The Solution

The DiffractMOD and FullWAVE tools simulated the wave optics behavior of the moth-eye pattern. LightTools software then traced rays through the OLED structure, including the effects calculated with the RSoft tools. RSoft's BSDF Utility provided a smooth and complete interface between the RSoft and LightTools simulations.

The Result

A traditional, flat glass-to-air interface had an out-coupling light extraction efficiency of 21%. The moth-eye pattern delivered an improved out-coupling efficiency of 30%.

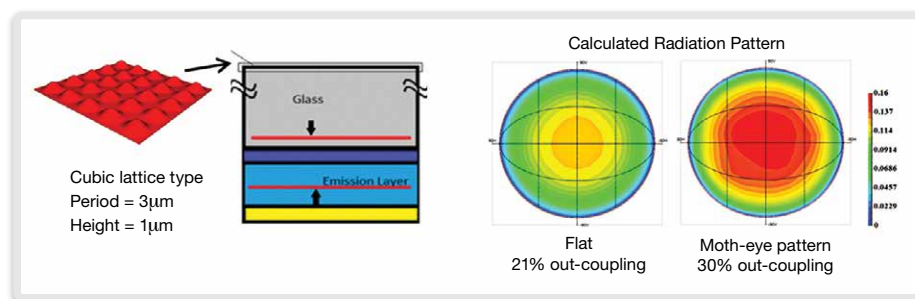


Figure 1. Moth-eye pattern on glass-to-air interface of an OLED (left); the moth-eye pattern resulted in a 30% out-coupling light extraction efficiency

For more information, please contact Synopsys' Optical Solutions Group at (626) 795-9101, visit <http://optics.synopsys.com/rsoft/>, or send an e-mail to rsoft_sales@synopsys.com.