

Abstract

It has been challenging to measure the optical modes in a nanostructured OLED. Here, we use angle-resolved electroluminescence spectroscopy (ARES) to directly measure the optical modes of a nanostructured OLED. Specifically, we use ARES to measure the cavity modes in a planar OLED and explain the angular spectrum shift caused by the cavity effect, and then measure the waveguide modes and surface plasmon polariton (SPP) modes of a nanostructured OLED having a linear or hexagonal photonic crystal pattern. Using this tool, we were able to identify different optical modes in a nanostructured OLEDs and demonstrate how they can be used for light extraction. We also introduce a new multi-mode OLED to totally suppress the microcavity effects. Finally, we demonstrate how a nanostructured OLED generates very directional and narrow emission spectrum.

Biography:

Franky So received his PhD degree in electrical engineering from the University of Southern California in 1991. He has previously worked at Hoechst Celanese Research Division and Motorola. In 2001, he joined OSRAM Opto Semiconductors and became the Head of OLED Research. He joined the University of Florida in 2005 and became the Rolf E. Hummel Professor in Electronic Materials in the Department of Materials Science and Engineering at the University of Florida. In 2015, he joined the Department of Materials Science and Engineering at the North Carolina State University where he is currently the Walter and Ida Freeman Distinguished Professor. While at Motorola, he was named the Distinguished Innovator and Master Innovator. Dr. So holds 120 issued patents and has published more than 180 journal articles with a Google H-index of 70. He is the Editor-in-Chief of the journal Materials Science and Engineering Reports and serves as an Associate Editor for IEEE Journal of Photovoltaics, IEEE Journal of Display Technology, SPIE Journal of Photonic Technology and Organic Electronics. So is a Distinguished Lecturer of the IEEE Photonics Society, a Fellow of the National Academy of Inventors, and a Fellow of IEEE, OSA and SPIE.