



第71回 OPERA研究交流セミナー
第64回 ISIT有機光エレクトロニクス研究特別室セミナー
第130回 未来化学創造センターセミナー



日時:2012年12月7日(金) 12:00-14:00

場所:九州大学 最先端有機光エレクトロニクス研究棟 3F会議室

“Hybrid white organic light-emitting diodes
with high efficiency/stability/CRI for lighting applications”

Tsinghua University
Lian Duan

White organic light-emitting diodes (WOLEDs) have attracted a great deal of research attentions for future lightings, due to their unique advantages such as uniform large-area emission, thin form-factor and suitability for flexible substrates. However, to be competitive against alternative technologies such as inorganic LEDs, the requirements of high efficiency, excellent stability, and high color-rendering index (CRI) must be satisfied simultaneously in one device, which remains elusive in scientific literatures till now. Here, we propose a novel device design principle to solve this problem by combining phosphors with deep-blue fluorophors capable of harvesting triplet energy via triplet-triplet annihilation (TTA). We have designed and synthesized high mobility electron transporting materials to secure strong TTA in blue fluorophors. From the transient electroluminescent behavior, it is found that TTA component can be as high as 35% in the optimized blue OLEDs, which is close to the theoretical upper limit when singlet-triplet branching ratio in the TTA process follows the spin statistics (1:3), suggesting the TTA upconversion process is quite efficient. This allows us to demonstrate hybrid WOLEDs with high efficiency/stability/CRI simultaneously, presenting a new possibility for OLEDs towards future lightings.

主催:九州大学 最先端有機光エレクトロニクス研究センター
:財団法人九州先端科学技術研究所(ISIT)
共催:九州大学 未来化学創造センター