

Iridium-free OLEDs solutions for the whole color spectrum

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In the last three years, great progress has been made on the field of iridium-free OLEDs. Extraordinary high device performance by using thermally activated delayed fluorescence (TADF) – or singlet harvesting – instead of phosphorescence has been demonstrated with devices exhibiting more than 20% external quantum efficiency.^{1,2} This puts both organic and copper-containing emitters on eye level with modern iridium materials in terms of efficiency.³

We recently presented TADF solutions to cover the whole color spectrum, from deep blue to red.⁴⁻⁶ The new TADF materials are suitable for both vacuum processing and solution processing techniques such as inkjet printing. Especially the realization of deep-blue emitters using the singlet-harvesting approach is of interest. Due to direct emission from the S₁-state, the generation of UV-photons, a known problem of phosphorescent emitters, can be avoided.

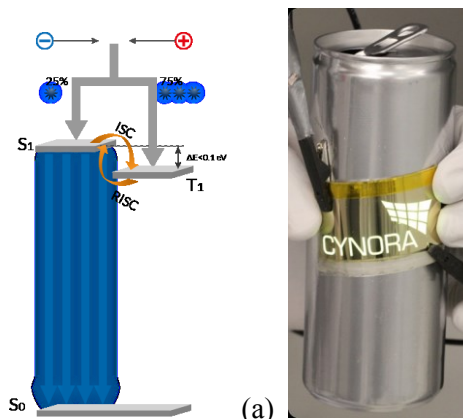


Fig. 1. Schematic description of the TADF process (a) and flexible TADF printed OLED prototype (b).

Without using outcoupling-enhancement technology, external quantum efficiency values up to 23% were realized in solution-processed green OLEDs, which is close to the theoretical efficiency limit.⁷⁻⁹

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