

Abstract

In the modern communication society the ideals are expanding from high tech luxury goods such as smart phones and large ultra high definition televisions for a more sophisticated energy economy awareness. Therefore, emerging new technologies such as Organic Light Emitting Diodes (OLEDs) are of great interest for research and industry as their properties outperform currently established competitive technology. In display applications, OLEDs score with an incredible viewing angle and a brilliant color impression. As a light source, OLEDs offer never-seen-before design options as surface emitters with an unmatched spectral quality of white light.

A key benefit of the OLED technology are the low energy consumption of the final devices and the potentially low cost, high throughput wet processing, both serving the high demand for energy efficiency.

In this work the knowledge and technology transfer of p-doping, typically performed by vacuum processing, to solution processing is demonstrated and analyzed. Thereby, following aspects are taken into account:

- Investigation of the chemical compatibility in terms of side reactions, as well as process originating limitations of solution processible materials and the established p-dopants known from vacuum processing.
- The individual characterization of p-doped charge transport layers for their electronic properties.
- The influence of p-doped charge transport layers on solution processed multilayer OLEDs with focus on versatility, lifetime and efficiency.
- The incorporation of p-doped charge transport layers in complex organic semiconducting devices such as tandem OLEDs and read only memories.