Inkjet printing the three organic functional layers of two-colored organic light emitting diodes.

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PII: S0040-6090(15)00332-6
DOI: doi: 10.1016/j.tsf.2015.03.064
Reference: TSF 34222

To appear in: *Thin Solid Films*

Received date: 28 July 2014
Revised date: 21 February 2015
Accepted date: 27 March 2015

Please cite this article as: Michiel J.J. Coenen, Thijs M.W.L. Slaats, Tamara M. Eggenhuisen, Pim Groen, Inkjet printing the three organic functional layers of two-colored organic light emitting diodes., *Thin Solid Films* (2015), doi: 10.1016/j.tsf.2015.03.064

Inkjet printing the three organic functional layers of two-colored organic light emitting diodes.

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Highlights

- Two-colored organic light emitting diodes with 3 inkjet printed device layers were fabricated.
- All materials were printed from halogen free inks.
- Inkjet printing of emissive materials is suitable for signage applications.

Abstract

Inkjet printing allows for the roll-2-roll fabrication of organic electronic devices at an industrial scale. In this paper we demonstrate the fabrication of two-colored organic light emitting diodes (OLEDs) in which three adjacent organic device layers were inkjet printed from halogen free inks. The resulting devices demonstrate the possibilities offered by this technique for the fabrication of OLEDs for signage and personalized electronics.

1. Introduction

The roll-2-roll (R2R) fabrication of organic electronics holds the promise to deliver large area flexible organic light emitting diode (OLED) lighting and organic photovoltaic (OPV) devices [1-7]. The wet chemical application of the different functional layers comprising these devices is an active area of research in both academia as well as in industry. A wide range of R2R compatible coating and printing methods is being considered for the fabrication of large area OPV and OLED devices including slot die coating, blade coating, flexographic printing, rotary screen printing and inkjet printing[2]. One of the main advantages of inkjet printing is that this technique is suitable for both coating large uniform areas as well as for the patterned application of high resolution features. Inkjet printing is further characterized by high materials utilization, and instantaneous change of the deposition pattern via the printer software, which makes additional structuring steps unnecessary [3,8,9]. Combined with speeds exceeding 100 m/min in current generation inkjet printers for the graphical industry [10], inkjet printing is one of the most promising methods for the fabrication of organic electronics from solution.