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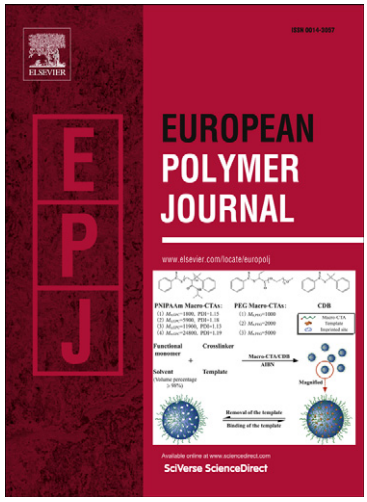

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Inkjet printing of chemically tailored light-emitting polymers

Anke Teichler,[1,2,3+] Zhe Shu,[1,2+] Andreas Wild,[1,2,3] Cornelia Bader,[1,2] Jürgen Nowotny,[1,2] Gerwin Kirchner,[4] Stephan Harkema,[4] Jolke Perelaer[1,2,3*] and Ulrich S. Schubert[1,2,3*]

[1] Laboratory of Organic and Macromolecular Chemistry (IOMC), Friedrich-Schiller-University Jena, Humboldtstr. 10, 07743 Jena, Germany

[2] Jena Center for Soft Matter (JCSM), Friedrich-Schiller-University Jena, Philosophenweg 7, 07743 Jena, Germany

[3] Dutch Polymer Institute (DPI), P.O. Box 513, 5600 MB Eindhoven, The Netherlands

[4] Holst Centre, High Tech Campus 31, 5656 AE Eindhoven, The Netherlands

E-mail: jolke.perelaer@uni-jena.de and ulrich.schubert@uni-jena.de

+ Both authors contributed equally to the presented work.

Abstract

For the implementation of an inkjet printing process in the fabrication of organic devices, like organic light emitting diodes (OLEDs), challenges such as the control over film formation need to be overcome in order to benefit from inkjet printing as a mask-free, material-efficient, non-contact and on-demand patterning technique. In this contribution, three different polymers with tailored properties were synthesized that reveal red, green and blue (RGB) emission colors. Film formation and thin-film properties were investigated in a combinatorial screening approach *via* inkjet printing. The solvent system toluene/*ortho*-dichlorobenzene revealed for all three polymers suitable film formation characteristics with final film thicknesses of 80 nm using a concentration of 4 mg/mL. Important relationships between polymer properties (molar mass), ink characteristics (viscosity) and film formation qualities (thickness, roughness) were identified. Finally, OLED devices were manufactured whereby the light emitting layers were inkjet printed using optimized processing conditions.

Keywords: π-conjugated polymers, chemical tailoring, inkjet printing, thin-film libraries, organic light emitting diode