Inkjet printing of functional polymers and nanoparticles

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Abstract

Inkjet printing is known to be a low cost and flexible technique for the controlled deposition of functional materials for applications in polymer light-emitting devices (PLEDs), solar cell devices, organic field effect transistors (oFETs) and tailor-made high-tech coatings. Moreover, it can be considered as a library preparation technique of functional polymers or nanoparticles allowing a systematic variation of parameters (e.g. thickness or chemical composition) for combinatorial studies. The presented research deals with two different and significant topics: investigations of ink formulations (using isolating, conducting and semi-conduction polymers as well as semi-conducting nanoparticles) and the systematic variation of the utilized surfaces of the respective substrates as well as the optimization of the printing conditions to improve the quality of inkjet printed films. Moreover, the application of inkjet etching will also be addressed.

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Author Biography

Ulrich S. Schubert was born in Tübingen/Germany in 1969. He studied chemistry and Biochemistry at the Universities of Frankfurt, Bayreuth (both Germany)and Richmond (USA). His Ph.D. work was performed under the super-vision of Professor Eisenbach (Bayreuth, Germany)and Professor Newkome (Florida, USA). In 1995 he obtained his doctorate with Prof. Eisenbach. After a postdoctoral training with Professor Lehn at the Université Strasbourg (France) he moved to the Technische Universität München (Germany)to obtain his habilitation in 1999 (with Professor Nuyken). From 1999 to spring 2000 he held a temporary position as a professor at the Center for NanoScience at the Universität München (Germany). Since June 2000 he is Full Professor at the Eindhoven University of Technology (Chair for Macromolecular Chemistry and Nanoscience). Besides that he was appointed in January 2003 as Program manager of the Cluster "High-throughput experimentation" and member of the management team in the Dutch Polymer Institute (DPI). Since middle of 2003 he is member of the National Dutch Security Council "hazardous substances". His awards include the Bayerischen Habilitations-Förderpreis, the Habilitanden-preis of the GDCh (Fachgruppe Makromolekulare Chemie), the Heisenberg-Stipendium of the DFG and the Dozenten-Stipendium of the Fonds der Chemischen Industrie. In January 2004 he was awarded with the VICI award by NWO (1.25 M€ price). He is currently member of the Board of the Center for NanoMaterials (cNM) Eindhoven, member of the Editorial Advisory Board of Macromol. Rapid Commun., Macromol. Chem. Phys., e-Polymers, QRAR & Comb. Chem., Design. Monomers Polym. and J. Polym. Sci.: Part A: Polym. Chem. as well as member of the Center for Nanoscience (CeNS) in Munich.