

Effect of Chemical Concentration on the Rheology of Inks for Inkjet Printing

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Abstract : Viscosity and surface tension are the fundamental rheological property of an ink for inkjet printing. In this work, we optimized the viscosity and surface tension of inkjet inks by varying the concentration of glycerol with water, PEDOT:PSS with glycerol and water, finally by adding the surfactant. The surface resistance of the sample was characterized by four-probe measurement principle. The change in volume of PEDOT:PSS in water, as well as the change in weight of glycerol in water has got a great influence on the viscosity on both temperature dependence and shear dependence behavior of the ink solution. The surface tension of the solution changed from 37 to 28 mN/m due to the addition of Triton. Varying the volume of PEDOT:PSS and the volume of glycerol in water has a great influence on the viscosity of the ink solution for inkjet printing. Viscosity drops from 12.5 to 9.5 mPa s with the addition of Triton at 25 oC. The PEDOT:PSS solution was found to be temperature dependence but not shear dependence as it is a Newtonian fluid. The sample was used to connect the light emitting diode (LED), and hence the electrical conductivity, with a surface resistance of 0.158 K Ω /square, was sufficient enough to give transfer current for LED lamp. The rheology of the inkjet ink is very critical for the successful droplet formation of the inkjet printing.

Keywords : shear rate, surface tension, surfactant, viscosity

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