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Color Properties and Porous Ink Layer –a study via Optical Spectroscopy

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The world of printing is rapidly and extensively developing due to the progress made in the inkjet technology. This printing technology delivers good print quality using the flexibility of digital printing at a breakthrough cost price. The R&D department of Canon Production Printing company, is a major player in the development of inkjet technologies for many different applications.

The physical processes which regulate the interactions between ink droplets and a thin porous paper have been the subject of many studies considering both theoretical understanding and sustainable industrial applications.

Understanding the processes as ink spreading, evaporation and imbibition into porous material is vital for having prints of high quality. Experimental studies based on Optical Spectroscopy & Microscopy, Scanning Electron Microscopy (SEM), Nuclear Magnetic Resonance (NMR), Automatic Scanning Absorptometer (ASA), etc have been used to get in-depth of these physical phenomena, which design the print drying. The result of drying process is an ink solid thin film formed onto porous paper. We have to consider a surface topography of the ink layer, as well as a resulted interface ink/paper. Due to the complex drying process, the ink layer might have a (in)homogeneous distribution of the pigment particles into the polymeric matrix. Also, our SEM studies showed the presence of the voids of various dimensions into this structure.

The outputs of a print process are image quality and print robustness. This means optical and mechanical properties of the thin ink layer onto porous paper. In this work, VIS optical spectroscopy is employed on both the computational simulation (Scout code program) and the experimental studies to reveal the relation between the compositional properties (pigment distribution, layer thickness, concentration and distribution of voids) of the ink layer and the color properties of the print.

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Primary author: Dr TOMOZEIU, Nicolae (Canon Production Printing B.V.)

Presenter: Dr TOMOZEIU, Nicolae (Canon Production Printing B.V.)

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