CHAPTER 5

CONCLUSIONS AND SUGGESTIONS

We investigated the dependence of pigment/binder ratio on the pigmented inkjet inks made from various dispersion techniques, including the print quality of these inks on the treated cotton fabrics, based on these four different pigment dispersion technologies, polymer dispersion (polyester), surfactant dispersion (low MW non-ionic surfactant), micro-encapsulation (acrylic polymer), and surface modification (pigment surfaces are modified with ionic group). The dependence of polymer dispersion on the various fabrics pre-treated with various pre-treatment chemicals was also investigated. The inks were made by different ratios of pigment to binder (P/B) at 1/0.5, 1/1 and 1/2. Furthermore, the ink properties are acceptable for inkjet properties: pH (7.5-9), viscosity (2-4.5 mPa s), surface tension (40-60 mN/m), and the pigment particle sizes (70-140 nm). The print qualities of all printed fabrics, in terms of color gamut and color gamut volume, air permeability, stiffness and wet/dry crockfastness, were measured.

Conclusions

Increasing binder content does not affect on surface tension. On the contrary, increasing binder concentration is one of the effective parameters on viscosity and the

optimum color gamut, color gamut volume and crockfastness for all pigmented inkjet inks with 1/2 P/B ratio.

The inks made from the surface modified pigment gave the inks with low viscosity and high surface tension. The pigmented inkjet inks formulated from surfactant dispersion showed a good compatibility and good printabilities such as: color gamut, color gamut volume, air permeability, and crockfastness.

The pre-treatment fabric with the cationic aluminum pigment dispersed in poly (vinyl alcohol) decreased the air permeability because of the thick film layer over the surface fabric. The thick film layer deposited blanketted the fiber and filled the fiber interstices.

Poly(ethylene oxide) deposited on the fabric surface, and occupied the inter fiber spaces produces a smooth surface, which contributed to the better air permeability and bending length of the printed fabrics.

The fabric treated with the cationic polymer(acrylic ester or Sunfix 555) made the fiber flattened, increased the surface area of the substrate, and reduced the amount of open inter-fiber spaces available. Therefore, this pre-treatment reagent produced the better printed color and crockfastness.

Suggestions

Apart from the present work on pigment dispersion techniques, we found that a thorough investigation on other pigment dispersion techniques, such as, surface modification and micro-encapsulation, is of great benefit to inkjet ink technologies. We recommend that this topic be carried out to achieve a good comparison of pigment dispersion in the absence and presence of polymer.