Fabrication and Applications of Nanoparticles

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Nanoparticles have aroused great attentions due to their board applications. The research and development of pigment nano-particles has greatly improved the performance of printing products. Through design and preparation of monodispersed nanoparticles, we have developed a simple method for assembly of large-area polymer photonic crystals (PCs), and achieved large-scale PCs by inkjet printing and spray coating, as-prepared colloidal PCs posses high mechanical strength, controllable wettability, and tunable stopbands. The extended applications of colloidal PCs are demonstrated in sensitive detecting, sensors and information storage etc.

Based on preparation of nano-composite transfer materials and modification of surface structure and property of plate, we have developed a green platemaking process for printing, which avoids discharge of chemical pollutant during traditional platemaking processes. The development of metal nanoparticle inks is expected to achieve a green revolution in printed circuit board industry, i.e. metal nano-particles could be applied as ink to print conductive circuit directly, which simplifies the complicated preparation process of traditional photolithography method, and significantly prevents discharge of chemical pollutant. Over all, nanoparticles have shown promising prospects in industry, and will lead the printing industry into a new age of greenization and digitalization.