Conducting Polymer Inks from Core-Shell Colloidal Nanoparticles for Flexographic Direct-Print

Description:

Metal-based nanoparticles and carbon black particles have been used previously as the conducting phase in inks for the printing market due to their high conductivity. Polymeric conductive materials can alleviate the high-cost burden of metals but have had significant problems with solubility and some resulting in lower than desirable conductivities. The technology discussed herein solves both of these barriers.

The conducting polymer ink technology includes a suspension of conductive core-shell nanoparticles in a carrier fluid. The ink can utilize any carrier liquid. The shell is formed of conducting polymer and the core material can be selected depending on the required characteristics of the ink. The electrochemical ink in this conducting polymer colloidal nanocomposite invention includes a dispersion of colloidal nanocomposite particles in liquid carrier.

Figure 1: Flexographic Printing

Applications:

- Printing processes: Lithography, flexography, screen, and inkjet printing
- Photovoltaics
- Radio Frequency Identification (RFID) components
- Sensors
- Memory devices

Benefits:

- Environmentally-friendly benign solvents (water, alcohols)
- The conducting polymer inks can be printed at high-speeds and high-volume
- Can be printed on a variety of substrates
- Low cost

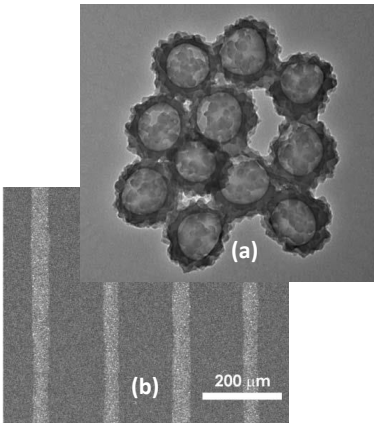

Figure 2. Technology examples a) micrograph of polyaniline-coated poly(butyl methacrylate) particles b) sample flexographically printed with conductive ink

Related Publications:

- Han, M.G. et al., "Polyaniline coated poly(butyl methacrylate) core–shell particles: roll-to-roll printing of templated electrically conductive structures" *J. Mater. Chem.,* 2007, 17, 1347–1352.

Inventors: Stephen Foulger, *et al*
Protection Status: Patent application filed
Licensing Status: Available for licensing
CURF Ref No: 06-034