

## Materials Technology



Title

### Polymer Beads Dispersed Liquid Crystal Devices (PBLCD)

#### Abstract

Polymer network, metal nano particles and functionalized quantum dyes were frequently added into the liquid crystal displays (LCDs) to promote the electro-optical properties, to enhance the threshold voltage, response time and optical contrast. In this patent, to improve electro-optical properties of cholesteric liquid crystal display devices, a series of organic polymer beads with various concentrations were added into the LCDs. Different from traditional LC cells, alignment layers coated on cell substrates are not necessary. To further increase the disturbance effect, the polymer particles were modified with surfactant DMOAP (dimethyloctadecyl-3-(trimethoxysilyl)propyl ammonium chloride) constructed the polymer particles a radial structure. Furthermore, considering the chiral effect on liquid crystals, chiral particles were added into LCDs to promote the electro-optical properties of the fabricated LCD devices. This patent shows an easy way to fabricate available LCDs showing high contrast, low threshold voltage and fast response time via adding polymer particles into the LCDs. The process and devices described in this patent can be applied in the field of liquid crystal displays and devices, smart windows, liquid crystalline ON-OFF devices, and field sequential color displays.

#### Benefits

1. Significantly improve the manufacturing process.
2. Reduce cost.
3. Promote the brightness of LCDs.
4. Improve the electro-optical properties of LCDs.

#### Industry Categories

This is a novel process and materials for the fabrication of Liquid Crystal Display and Smart Windows. An easier process for LCDs fabrication is achieved by this novel skill. Lower cost and easier process are the merits of this novel skill.

#### Keywords

Liquid Crystal Display, Smart Windows, Polymer Particles, Nanoparticles, Polymer Stabilized Liquid Crystal Display

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