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Polymer disperse liquid crystal display using metallic doping nanospheres

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Polymer-disperse liquid crystal (PDLC) works by changing the refractive index matching and mismatching between the injected liquid and glass. The light cannot pass through the PDLC film by the index mismatching when the applied voltage turn off, called off state of the PDLC. Otherwise, if there is the electric field applied, the liquid crystals (LC) inside the PDLC droplet will be rotated to parallel arrangement. Then light will directly pass through the film by index match, called on state type. Due to these important properties, LC/polymer mixture recently are studies for a wide variety of application, especially most popular in the display and smart window devices. In this work, we developed a novel polymer disperse liquid crystal (PDLC) display using heat curing method. In this article, doped with small amount of (about 5wt %) 3µm-diameter silver nanospheres into PDLC. The silver nanospheres can construct the partial electric field between each other in the electric field applied. Therefore these partial electric field can decrease the operating voltage to 40V and also have high contrast and on state transmittance about 73%.

Biography

Chii-Chang Chen received his PhD degree in Sciences for Engineer from Université de Franche-Comté (Besançon, France) in 1998. His dissertation work dealt with modification of polarization-independent modulators in LiNbO3 by laser ablation. In 1998, he worked in Laboratoire d'Optique P.M. Duffieux of Besancon to study high-speed LiNbO3 modulators. He joined Friedrich-Schiller-Universität Jena (Germany) as a visiting researcher in 2005 for 3 months and in 2007 for half month. Since 2005, he became Associate Professor in IOS-NCU. He joined Université Paris 13 (France) as a visiting researcher in 2006, 2007 and 2011 for 1 month, respectively. He received the NSC Wu Ta-You Memorial Award in 2006 and NCU Excellent Research Award from 2006 to 2009, respectively. In 2008, he received Ritek young optical engineering award from Taiwan Optical Engineering Society. Since 2009, he has been working as a Professor. He became Distinguished Professor of NCU in 2010. His current research interests are photonic crystals, nano-optics in LEDs and solar cells, micro-optics, passive components for WDM fiber-optic communications and bio-sensors.

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