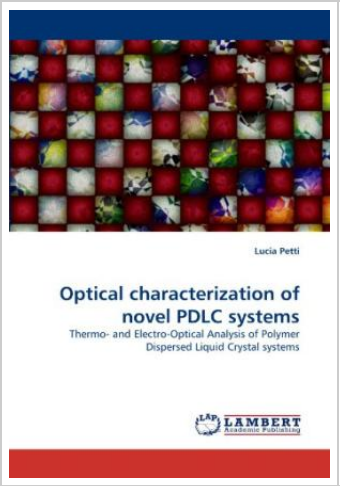




# Optical characterization of novel PDLC systems

By Petti, Lucia

Condition: New. Publisher/Verlag: LAP Lambert Academic Publishing | Thermo- and Electro-Optical Analysis of Polymer Dispersed Liquid Crystal systems | The objective of this research was to prepare PDLCs systems with improved liquid crystal/polymer composition for thermo- and electro-optical performance. Two thermosetting matrices based on an unsaturated polyester resin and a bifunctional epoxy resin, respectively, are employed to realise PDLCs. At a second step, different dopants are used in order to prepare dye-doped PDLC (D-PDLCs) epoxy based films. The dyes contribute to an increase in light absorption, thus reducing remarkably the power necessary to induce nonlinear optical effects. A complete optical, thermo-optical and electro-optical characterisation, a morphological study, and finally an analysis of some nonlinear optical effects in these materials is performed. A comparison of the optical properties between D-PDLCs and undoped PDLCs is presented. Linear and nonlinear effects occurring in these materials, such as self-transparency, thermally induced optical bistability and optically induced light modulation, are studied. This work confirms that PDLCs with optimised optical properties can be considered for the design of a range of different important optical devices. | Format: Paperback | Language/Sprache: english | 223 gr | 156 pp.



### Reviews

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Thermo- and Electro-Optical Analysis of Polymer Dispersed Liquid Crystal systems. LAP Lambert Academic Publishing ( 2010-01-26 ).Â  The objective of this research was to prepare PDLCs systems with improved liquid crystal/polymer composition for thermo- and electro-optical performance. Two thermosetting matrices based on an unsaturated polyester resin and a bifunctional epoxy resin, respectively, are employed to realise PDLCs. At a second step, different dopants are used in order to prepare dye-doped PDLC (D-PDLCs) epoxy based films. The dyes contribute to an increase in light absorption, thus reducing remarkably the power necessary to induce nonlinear optical effects. MarilÃº ChÃ¡vez-Castillo, Arelis Ledesma-JuÃ¡rez, Marisol GÃ¼izado-RodrÃguez, JesÃºs CastrellÃ³n-Uribe, Gabriel Ramos-Ortiz, Mario RodrÃguez, JosÃ©-Luis Maldonado, Jorge-Antonio Guerrero-Ãlvarez, Victor Barba, "Third-Order Nonlinear Optical Behavior of Novel Polythiophene Derivatives Functionalized with Disperse Red 19 Chromophore", International Journal of Polymer Science, vol. 2015, Article ID 219361, 10 pages, 2015. https://doi.org/10.1155/2015/219361. Show citation.Â Synthesis, characterization, and applications of polythiophene (PT) derivatives are nowadays subjects of intense research [1â€“4].Â Moreover, photoinduced birefringence, dichroism, and two-photon absorption processes can also take place in such systems. A novel variable optical attenuator(VOA) based on polymer-dispersed liquid crystals(PDLC) is presented The device employs PDLC into the optical path of two collimated single-mode fibers with the transparent ITO electric thin films as the electrode of the PDLC. Utilized the electro-optic properties of PDLC under the condition of the different electric field intensity to realize the continuous controllable attenuate on the power of the optical path. The VOA was fabricated by silicon micromachining techniques and the performance is evaluated The measuring results show the insertion loss of the fa POLYMER-DISPERSED liquid crystals (PDLCs) represent an important new class of materials for display applica-tions1â€“8. Generally, PDLCs consist of micrometre-sized, birefringent, liquid-crystalline droplets dispersed in an otherwise optically transparent and uniform polymer film. Such PDLC films are easily fabricated using one of a few simple coating procedures. Figure 1 presents a conventio-nal PDLC material device and a nanoparticle-doped PDLC device.Â  An important aspect of the PDLC devices is that they require no extra optical elements (other than optically transparent electrodes) to provide optical contrast. *For correspondence. (e-mail: yjjeon@konkuk.ac.kr). Because little current flows through the film, they con-sume relatively little electric power.