摘要

具末端雙壓克力基可照光聚合之彎曲型結構單體已成功的被合成出來，並對此單體在 PSLC 上的應用加以討論。我們也期望能藉由改變單體之化學結構，來有效控制高分子的形態(morphology)，進而了解照光聚合對於高分子形態之影響因素。在液晶元件分析上，本研究著重於使用SEM表面分析儀器，探討其各種光聚合情況下(UV 燈強度及提供外加電場)，表面形態對光電性質之影響。

照光聚合單體 B-ThBiPhC6Ac (2,5-Bis-[4-(6-acryloyloxy -hexyloxy)-phenyl]-thiophene) 在照光聚合後其高分子形成顆粒狀(beadlike)的形態，而化學結構與前者相似的單體 B-TrPhC6Ac (4,4" -Bis-(6-acryloyloxy-hexyloxy)-m-terphenyl))，僅後者的中心化學結構改為苯環，由其 SEM 圖可以看出其高分子的形態改變為顆粒狀和纖維狀 (filberilike)。

至於 PSLC 之光電性質研究，在照光聚合時，給予液晶盒一外加電場，一般稱之為 normal-mode。當元件在無外加電場情況下，偏振光和液晶盒磨擦 (rubbing) 方向平行時，此時 PSLC cell 為散射態(scattered)。反之，當元件給予一電場時，此時 PSLC cell 呈現穿透態。

而在單體照光反應之性質上，單體 B-Es-TrPhC6Ac 在 60 ℃照光聚合時，其照光反應轉換率大約為 93 %。

Abstract

Photo-crosslinkable monomers with bent-core structures containing terminal diacrylate groups were successful synthesized and the applications of monomers in polymer stabilized liquid crystal (PSLC) devices have been surveyed.

The polymer morphologies were effectively controlled by the monomers' chemical structures. Therefore, the factors to influence the polymer morphologies by photo-polymerization can be realized. For the investigation of LC cells, this research focus on the surface analyses by suing SEM, both of the morphologies caused by various photo-polymerization conditions (various intensities of UV light and the presence of electric fields) and the effects of morphology on the electro-optical properties will be surveyed.

The beadlike morphology was obtained from photo-crosslinkable monomer B-ThBiPhC6Ac (2,5-Bis-[4-(6-acryloyloxy-hexyloxy) –phenyl]-thiophene). B-TrPhC6Ac with the analogous chemical structure, except for the phenyl core structures, has a beadlike and filberlike morphology by SEM photos.

As for electro-optical studies of PSLC, the normal-mode was acquired by that the LC cell was exposed to UV light under an electric field. As the polarized light paralleled to the rubbing direction, the light is scattered. On the contrary, the cell is transparent in the voltage-on state.

As for photo-polymerization of monomers, monomer B-Es-TrPhC6Ac has a photo-polymerized conversion rate about 93 % at 60 °C.