APPL-P028

PIXEL-ISOLATED LIQUID CRYSTAL STRUCTURE USING ANISOTROPIC PHASE SEPARATION

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In recent years, liquid crystal (LC) devices using plastic film substrates have drawn much attention for use in applications such as smart cards, PDA, and head mount displays because of their lighter weight, thinner packaging, flexibility, and reduced manufacturing cost through continuous roll processing. However, it is clear that plastic substrates can't give a solid mechanical support for the molecular alignment of LCs between them. Specially, ferroelectric LCs show very weak mechanical stability because of the presence of fragile smectic layers even between glass substrates. In order to overcome the above problems, we developed a new device structure using anisotropic phase separation from LCs and polymer composite materials using UV intensity variation and polymer wetting properties. In the device, the LC molecules are isolated in pixels where LCs are surrounded by the inter-pixel vertical polymer walls and the horizontal polymer films on the upper substrate. These devices show very good mechanical stability against external pressure. The electro-optic characteristics and the mechanical stability of the devices are discussed in view of the flexible display applications.

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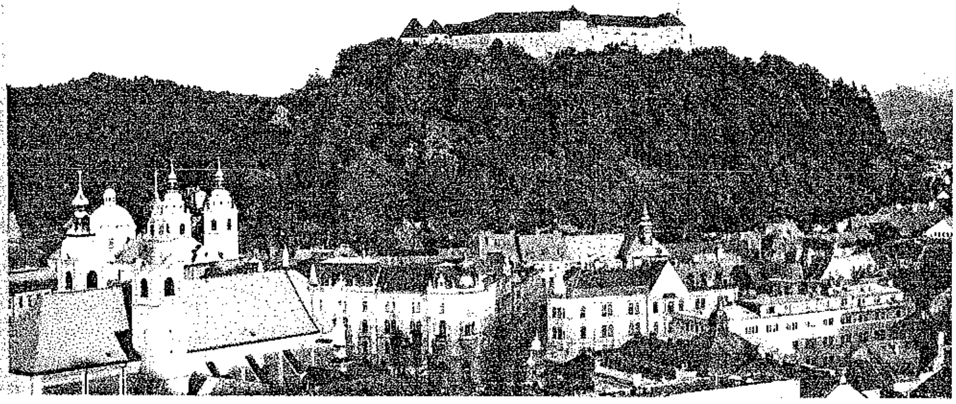

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