

Inorganic ferroelectric materials for LC alignment for high performance display design

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Abstract : Ion bombarded inorganic materials for LC alignment has been researched as it provides controllability in a nonstop process for producing high-resolution displays. Many optically transparent insulators such as SiO_x^1 and a-C:H^2 have been investigated as potential candidates for inorganic alignment materials. Even so, LC orientation on a new material with superior capacity is required to produce high-performance displays. Many inorganic materials with high permittivities can reduce the voltage losses due to the LC alignment layer that are a trade-off for its capacitance. The minimum voltage for device operation can be applied to the LC under low external voltage using these materials. This means that low power consumption for LCD applications can be achieved using a high-k alignment structure in which the LC can be driven effectively with a low threshold voltage. Among the many other potential high-k oxides, HfO_2 is considered to be one of the most promising due to its remarkable properties of high dielectric constant, relatively low leakage current, large band gap (5.68 eV), and high transparency.³ Due to these characteristics, HfO_2 can be used in LC alignment to increase the capacitance of the inorganic alignment layer for low-voltage driving of LCs.

Key Words : Ion bombardment, inorganic materials, LC alignment

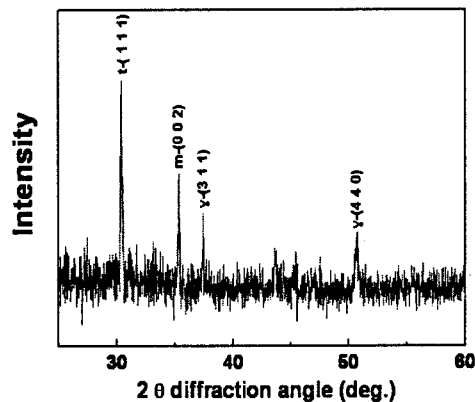


Figure 1. XRD pattern of $\text{HfO}_2/\text{Al}_2\text{O}_3$ on an ITO-coated glass substrate.

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