

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

The mechanism of controlling liquid crystal surface pretilt angle on plasma beam sputtered films¹ RU-PIN PAN, National Chiao Tung University, MENG-CHIOU HUANG, Institute of Atomic and Molecular Sciences, Academia Sinica, WEI-TA WU, CHENG-WEI LAI, HSIN-YING WU, National Chiao Tung University — In liquid crystal (LC) devices, the surface alignment is essential. The polyimide (PI) film is commonly used to make LC molecules parallel to the surface. A rubbing process is usually applied to choose a particular direction on the surface. A pretilt angle is also induced, which is useful but usually very small. In previous works, we have found out that the sputtered ion-oxide films can give a homeotropic alignment to LC, i.e., the LC molecules are perpendicular to the surface. In this work, we combine these two effects by sputtering the ion-oxide particles onto the PI coated glasses. By adjusting the sputtering conditions, the LC alignment are controlled. A wide range of pretilt angles have been achieved, while the rubbing process is no longer required. A thorough study by varying the sputtering conditions, such as voltage, current, and time duration, and observing the pretilt angles is carried out. The sputtered surfaces are examined with scanning electron microscope to see the coverage. By considering the charge distribution and electric field within the sputter, a quantitative model is then developed, which explains how the sputtering conditions affect the pretilt angles almost perfectly.

¹Supported by National Science Council, ROC, under grand number 96-2221-E-009-131-MY3 and Academia Sinica AS-98-TP-A10. Ru-Pin Pan
National Chiao Tung University

Date submitted: 17 Nov 2011

Electronic form version 1.4