You are cordially invited to a seminar on

Nano-Scale Photoaligning and Photopatterning Technology: Applications in Displays and Photonics

DATE: 6 April 2015, Monday
TIME: 10.30 am to 11.30 am
VENUE: Executive Seminar Room (S2.2-B2-53)
ORGANISER: School of EEE

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ABSTRACT

The advantages of LC photoalignment technology in comparison with common “rubbing” alignment methods tend to the continuation of the research in this field. Almost all the criteria of perfect LC alignment are met in case of azo-dye layers. Nowadays azo-dye alignment materials can be already used in LCD manufacturing, e.g. for the alignment of monomers in LCP films for new generations of photonics and optics devices.

Recently the new application of photoaligned technology for the tunable LC lenses with a variable focal distance was proposed. Thin photo-patterned micropolarizer array for CMOS image sensors for in-situ analysis of the four Stokes parameters of the output optical signal are also envisaged.

New optically rewritable (ORW) liquid crystal photonics devices with a light controllable structure may include LC plane waveguides, LC polarization dependent elements, such as lenses and wave plates, LC polarization rotators and polarization controllers, light and voltage controllable diffraction gratings for optical filters etc.

We are sure, that the common rubbing alignment technology will be totally replaced by a photoalignment in the near future, thus increasing the quality of LCD. Photoalignment is definitely the only technology, which enable non-defect LC orientation inside superthin tubes (tunable photonic crystal/liquid crystal fiber structure) and on tiny rings (Si micro-ring resonators).

Fast ferroelectric liquid crystal devices (FLCD) are achieved through the application of nano-scale photo aligning (PA) layers in FLC cells. The novel photoaligned FLC devices may include field sequential color (FSC) FLC with a high resolution, high brightness, low power consumption and extended color gamut to be used for PCs, PDAs, switchable goggles, and new generation of switchable 2D/3D LCD TVs, as well as photonics elements. The FSC FLC micro display is now one of the most advanced technologies for the high resolution fast micro-displays and pico-projectors with a high brightness and low power consumption.

BIOGRAPHY

Chigrinov is a professor of Electronic & Computer Engineering at HKUST since 1999. He is an expert in Flat Panel Technology in Russia, recognized by World Technology Evaluation Centre, 1994, a member of Editorial Board of “LIQUID CRYSTAL TODAY” since 1996, a senior member of the Society of Information Display (SID) since 2004, associate editor of J. of SID since 2005 and become a fellow of SID since 2008. He is an author of 6 books, 25 reviews and book chapters, 240 refereed papers, 548 Conference presentations and 95 patents and patent applications, including 19 US granted patents. He won the Research Excellence Award of SENG, HKUST, that recognizes the efforts of an outstanding faculty member with a proven record of research excellence in 2012.