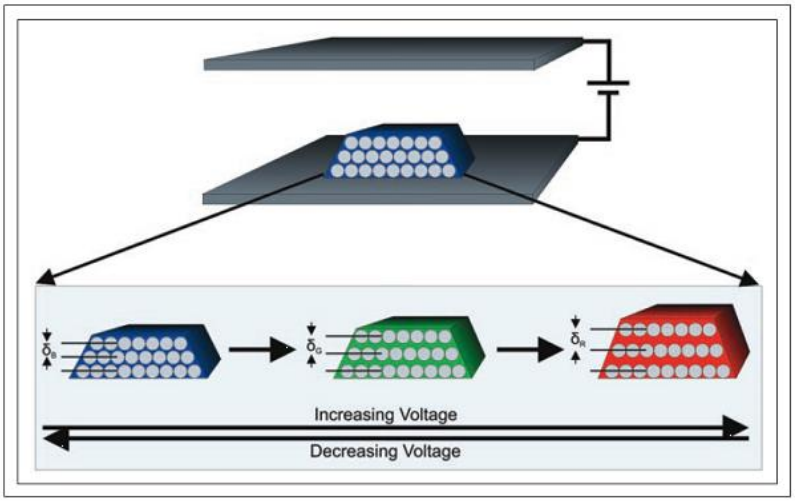
There's more to life than OLEDs and Electrophoretic Displays...

Dr Harry Zervos, Technical Analyst, IDTechEx

At the forthcoming IDTechEx conference; Printed Electronics USA in Santa Clara, on November 30-December 1, 2011, there will be a focus on technologies such as OLEDs and electrophoretic displays, with leading innovators such as Sumitomo, Panasonic and E Ink discussing their progress. But there are other display technologies emerging, at earlier stages of commercialization that promise performance enhancement, cost reduction and new possibilities. Two of these technologies, QD Vision's QLEDs and Opalux 's photonic crystal displays are described below.

QD Vision



QD Vision's quantum dot light emitting diodes (QLEDs) are an advanced technology currently in development that will deliver a solution applicable to both displays and lighting sectors. An emerging, printable thin film electroluminescent device technology, QLEDs are excited electrically to generate light. QLEDs are electroluminescent colloidal quantum dots that combine the customizable, saturated, stable color and low-voltage performance found in inorganic LEDs with the solution processability of polymers. The result is a reliable, energy efficient, tunable color solution for displays and

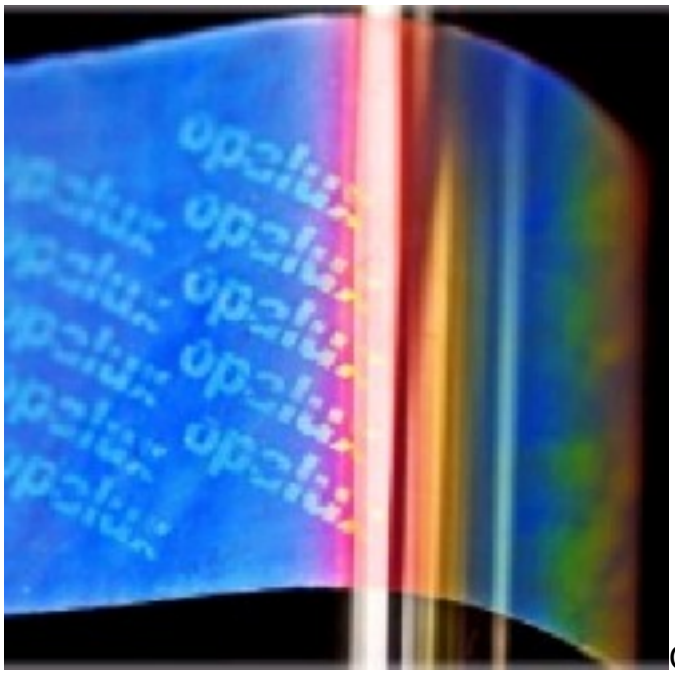
lighting that can be less costly to manufacture and that can employ ultra-thin, transparent or flexible substrates.

While still at an early stage of development and commercialization, QLED performance is already suitable for use in certain products that require precision color solutions in an ultra-slim form factor, including monochrome visible and infrared displays, and lighting devices for machine and night vision applications.

Their "Quantum Light" platform exploits the unique light-emitting properties of semiconductor nanocrystals to deliver a new value proposition for LED-based products, including high color quality, high-power efficiency, manufacturing versatility and design flexibility while requiring less power than current technologies for flat-panel displays, solid state lighting, consumer electronics goods etc.

QD Vision is currently working with several global consumer electronics companies that are building new products that employ its Quantum Light™ optics. In September 2011 the company announced it had relocated to a new, high-volume production facility in Lexington, Massachusetts to support new products launching in 2012.

Opalux

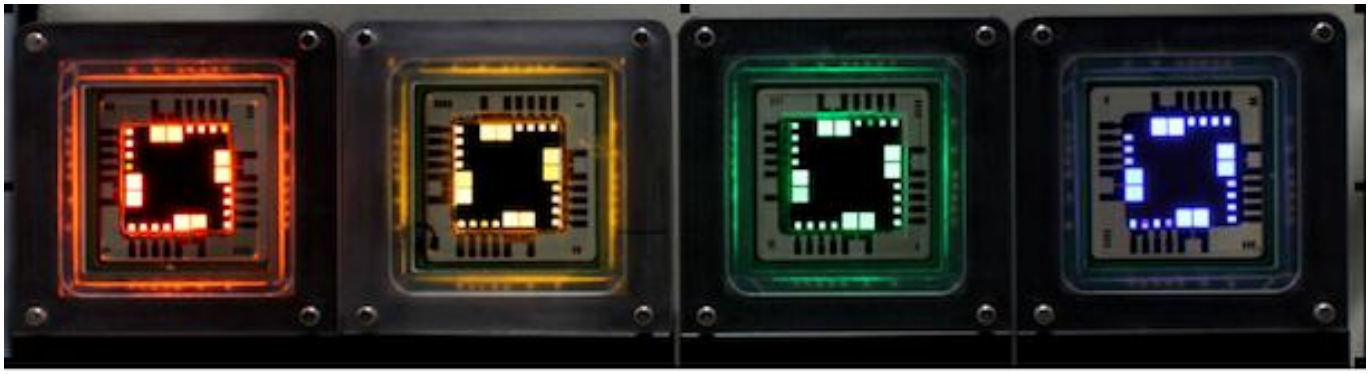


Opalux, Inc., is developing a platform of technologies based on photonic color. These technologies consist of active polymer-based photonic crystal (PC) materials that can respond to an array of stimuli such as pressure, stretching, heat, humidity, and electrical current/voltage. One of the technologies is Photonic Ink (P-Ink), a tunable electroactive material. By applying different voltages to this material, the PC structure can be modulated to reflect any desired spectral color in the visible spectrum. Not only is the color tunable, but switching is carried out at low voltages (1.5 V or lower) and amperages (?A), and the resulting color states are bistable.

P-Ink materials are nanocomposites, fabricated through a combination of colloidal,

inorganic, and polymer chemistry.The structural scaffold of P-Ink materials is made up of an ordered array of silica microspheres. The voids between these microspheres are filled with a crosslinked electroactive polymer.

The color switching of P-Ink film in response to external electrical stimuli is caused by the expansion and contraction of the crosslinked electroactive polymer network. Shown below is the schematic structure of a P-Ink device and how the P-Ink materials respond to external electrical stimuli. Since the inter-sphere spacing (?) is what dictates the reflected color of the materials, these devices can span the entire visible spectrum (?B ? ?G ? ?R) simply by changing the applied voltage. This process also works in reverse by applying a negative voltage, where the thickness of the film decreases and the reflected light shifts to "bluer" wavelengths.



Roll-outs will focus first on simpler and less-demanding devices to be followed by increasingly sophisticated and higher volume applications. A number of potential applications related to simple color-changing surfaces, from mobile electronics to office interiors, are currently under development. In addition, due to mechanical flexibility and competitive price points, a variety of simple displays integrated into products such as plastic cards and product packaging are being envisioned. After the launch and adoption of such simple products, active-matrix driving schemes will follow.

Hear both companies present their latest developments at IDTechEx's Printed Electronics USA. For more information on the conference, please visit www.idtechex.com/peUSA [1]

Source URL (retrieved on *12/19/2014 - 8:47pm*):
http://www.ecnmag.com/blogs/2011/10/theres-more-life-oleds-and-electrophoretic-displays

Links:
[1] http://www.idtechex.com/peUSA