

Tiny Quantum Dots Give Displays Big Colour

Written by Bob Snyder
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Larger than a water molecule, but smaller than a virus, the tiny phosphors in Nanosys quantum dots could make flat-panel displays much brighter and more colorful without increasing their costs, energy consumption or size.

The new LCD technology uses Quantum Dot Enhancement Film (QDEF), a first-of-its-kind technology to increase the color gamut in a display by as much as 3X without any increase in cost, size or power consumption.

The result, says Nanosys, is “richer and more viscerally vibrant colors such as deeper reds and greens, which are colors the human eye sees more intensely than others.”

The QDEF technology is available to display makers for the first time as an optical film, which can be scaled to fit any size flat panel, even the largest models. The current generation of displays in smartphones, tablets, laptops and big TVs, argues Nanosys, can only express about 20%-35% of the colors the human eye can see. QDEF displays will be able to deliver more than 60% of visible colors on a display.

Nanosys makes QDEF technology with its patented quantum dot materials. It disperses them in a polymer matrix and suspends them within an optical film. The material makes it easier to create a high-quality white light with a wide range of hues when hit with an energy efficient blue

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light-emitting diode.

Larger than a water molecule, but smaller than a virus, the tiny phosphors in the Nanosys quantum dots can convert blue light from a standard gallium nitride LED into different wavelengths based upon their size. Larger dots emit longer wavelengths (red), while smaller dots emit shorter wavelengths (green). Blending together a mix of dot colors allows Nanosys to engineer a new spectrum of light. Nanosys basically adds a new layer of material to an LCD screen during manufacturing.

This allows LCD manufacturers to accurately match their LED backlight to their LCD color filters to achieve the best possible color and efficiency performance.

Nanosys first commercialized the quantum dot technology with QuantumRail, a component that improved the quality of small-size LCDs. That technology has been licensed to LG Innotek.

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