SSL Postings
U.S. DEPARTMENT OF ENERGY

July 21, 2014

The solid-state lighting industry is steadily growing and establishing a manufacturing presence here at home. Solid-state lighting was not only born of U.S. ingenuity and R&D, but is riding the crest of a worldwide trend toward greater energy efficiency. This offers a golden opportunity for U.S. manufacturing to take a significant role in SSL. From time to time, these Postings *will focus on SSL companies manufacturing here in the U.S., a series we call "SSL in America." This is not intended to endorse or promote any of the companies, but rather to describe advances in energy-efficient solid-state lighting. The activities you'll read about here are consistent with the DOE white paper "Keeping Manufacturing in the United States," which grew out of DOE's 2010 SSL Manufacturing R&D Workshop.*

Spotlight on OLEDWorks

OLEDWorks is a manufacturer of OLED lighting panels and—for now, at least—holds the distinction of being the only such manufacturer in the U.S. The company is based in Rochester, NY, where it does all of its manufacturing as well as all of its engineering, R&D, and everything else.

Not coincidentally, Rochester is the birthplace of OLEDs, which were invented at Eastman Kodak in the 1980s. Kodak significantly advanced the technology but got out of the OLED business in 2009. The following year, OLEDWorks was founded by several former members of Kodak's OLED team, who brought many of their colleagues onboard to join the new endeavor. OLEDWorks also licensed the OLED intellectual property developed at Kodak.

OLEDWorks occupies a single integrated facility in Rochester, housed in a large manufacturing complex where automotive parts used to be made. More than 30 people work fulltime there for the company, including several consultants and engineering "co-op" students in a work-study program from nearby Rochester Institute of Technology. Most of OLEDWorks' positions are high-tech and high-skill, as OLED manufacturing is a largely automated process.

The company recently came out with its first commercial product, a 1"x4" amber OLED panel that Acuity Brands Lighting plans to incorporate into luminaires it's

developing for the healthcare market. OLEDWorks COO John Hamer explains that amber OLED lights are well-suited to that market because they uniquely provide low-glare, naturally diffuse light free of the blue wavelengths that can disrupt circadian rhythms. He adds that many other luminaire manufacturers have recently expressed interest in buying prototype white or colored OLED panels for a host of other uses, so don't be surprised if you see more OLEDWorks panels finding their way into commercial products before too long.

The introduction of low-cost OLED lighting products will provide a boost to the OLED lighting industry, whose technology is several years younger than LED lighting in terms of development and has yet to establish a significant market presence. One of the biggest problems with OLED lighting at this stage of the game, John says, is lack of market awareness. Not only general consumers, but even many manufacturers, lighting designers, and others in the industry are simply not aware of the technology and its unique advantages—such as producing little heat and being inherently diffuse, with full-spectrum broad emitters. These advantages make OLED lighting the ideal energy-efficient complement to LEDs and an interesting proposition for a variety of applications—some of them involving general illumination, but others more specialized, including signage, transportation (plains, trains, automobiles), appliances, and machine vision.

The major challenge with OLED lighting, John emphasizes, is price, as OLEDs have been expensive to manufacture—which is why OLEDWorks' approach has been to drive the cost down while also boosting the efficiency. He notes that considerable progress has been made on both fronts, with prices continuing to drop, and that even right now there are a number of natural fits where OLED lighting could already be commercially competitive.

John says OLEDWorks panels have achieved 60 lm/W in the lab, with CRI >80 and lifetime of 20,000 hours, and the company's goal is to translate that into commercial products with similar performance. He anticipates OLEDWorks—whose tandem-hybrid approach uses two OLEDs stacked one on top of the other—achieving that goal this year by optimizing the thicknesses and composition of the 15 layers of organic materials. By then, John adds, the company should also have a commercially available 2"x7" panel, which right now is still in the prototype stage.

He notes that most luminaire manufacturers are fairly small operations that don't need components in huge quantities—which gives small, nimble suppliers such as OLEDWorks an advantage, because they can do shorter runs cost-effectively and can tailor components to the demands of each job, in terms of color, form factor, etc.

John says that many of OLEDWorks' suppliers are domestic, and that the company's custom solutions, such as encapsulation processes and equipment, are usually developed in collaboration with firms that are based here—not only

because of convenience, but also because it’s easier to protect intellectual property. Currently, OLEDWorks is also partnering with two U.S. companies on DOE-funded R&D OLED lighting projects, one of which involves light-shaping and the other, light extraction.

OLEDWorks is clearly poised on the brink. Its success in becoming a commercially viable market force will help pave the way for the U.S. OLED lighting industry. John feels that OLED lighting manufacturing belongs here—not only because OLEDs were invented in the U.S., but because we have a great deal of expertise and know-how.

OLEDWorks is among a number of companies that are working to create and strengthen a solid-state lighting manufacturing base here in the U.S. This will not only help bring significant energy savings through more efficient lighting products, but will benefit our economy by adding jobs at multiple levels of the supply chain.

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.