SSL Postings
U.S. DEPARTMENT OF ENERGY

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Although you do not often hear about growth in domestic manufacturing here in the United States, 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 also 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, the Postings *focus on SSL companies manufacturing here in the U.S., in a series called "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 U.S. Department of Energy (DOE) white paper "Prospects for U.S.-Based Manufacturing in the SSL Industry."*

Spotlight on Pixelligent

Pixelligent makes high-refractive-index optical materials that are sold primarily to manufacturers of LEDs and OLEDs, who use them to increase the light-extraction efficiency of their products. Pixelligent vice president of product management Matt Healy explains that these optical materials are based on zirconia nanocrystals, which are mixed in with the silicone encapsulant that covers LEDs, and in OLEDs comprise a smoothing layer that's sandwiched between the indium tin oxide and the glass. Zirconia has a high refractive index, so using it in this way while retaining optical clarity makes it possible to extract more light. As a result of more light being extracted, Matt notes, fewer LEDs or OLEDs are needed to get the same amount of lumens, which lowers the cost. He adds that the company's nanocrystals are also used by manufacturers of optical components and films, to facilitate light management.

Pixelligent was founded in 1999 in College Park, MD, by grad students at the University of Maryland, whose Maryland Technology Enterprise Institute served as an incubator in the company's early years. Back then, Pixelligent's nanocrystals were used as an overlayer to increase the resolution in lithography, but the company's focus shifted from lithography to solid-state lighting in 2009, and two years later it relocated a few dozen miles north up Interstate 95 to Baltimore, its present location. Matt explains that the move was necessitated by Pixelligent's

growth and the fact that the Baltimore facility — formerly used by a biopharmaceutical firm — was a near-perfect match for the company's R&D and manufacturing needs.

About 40 people are employed at the Baltimore headquarters, ranging from engineers and R&D chemists to marketing and product development staff. There, just a few minutes from the city's port, Pixelligent does the bulk of its manufacturing, with a contract manufacturer in Pennsylvania handling the rest when the quantities needed exceed the company's internal capacity. Matt says that most of Pixelligent's supply chain is domestic, and that the company relies on local labs for additional analytic capability to a large extent. He notes that Baltimore's existing biotech and pharmaceutical infrastructure has been an advantage for Pixelligent in terms of facilities and labor, but that because the lighting and semiconductor industries don't have a presence in the region, the company has to look further afield to find certain types of talent, such as materials scientists.

Matt observes that Pixelligent's investor base, which has been very supportive, is primarily local, and adds that the company has also benefited from several DOE funding awards — the latest of which was just announced. He cites intellectual property protection as a major reason Pixelligent manufactures domestically, because it's easier to protect its proprietary nanocrystal "secret sauce" here in the U.S. than it would be if the products were manufactured overseas. In addition, manufacturing domestically enables the company to tightly control the entire manufacturing process. What's more, Matt adds, having Pixelligent's manufacturing operations working side-by-side with product development allows for flexibility in meeting customer needs, reduces time to market, cuts down on waste, and enables the company to make the most efficient use of its various teams. He says the higher labor rates in the U.S. aren't much of a negative factor, because labor doesn't comprise a significant portion of Pixelligent's product cost, but the company does have to deal with a certain amount of red tape in exporting its products to Asia, where the bulk of its customers are located.

Pixelligent 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.