

PRESS RELEASE

Colnatec partners with Novaled to test world's first heated sensor system for pinpoint precision OLEDs

Gilbert, AZ, USA and Dresden, Germany - September 12th, 2013 – [Colnatec LLC](#), manufacturer of the only temperature-controlled sensors for thickness measurement of thin film devices, and [Novaled](#), a world class provider of [OLED](#) (Organic Light Emitting Diode) technologies and materials, will work together in a joint research and development project to test the performance of the world's first heated quartz crystal microbalance (QCM) sensor system, "Tempe", for device layer self-regeneration in continuously-run OLED production.

With the advent of organic electronics, the effect of temperature during deposition became a topic due to unique film growth variables of organic materials. The measurement of the physical thickness of an OLED layer (often on the order of nanometers) is a direct function of the temperature of the sensor and substrate being coated. Unless temperature is accounted for and equalized, thickness accuracy will suffer significantly, leading to inconsistencies as great as 50% per layer. Organic materials such as AlQ3 are not a 'flat film' like many optical films, yet other commercially available sensors treat them as such. Heating a sensor and controlling it reduces stress and relaxes the film, and also allows for 'baking off' accumulated material, thereby extending sensor lifetime, a critical factor for cost efficiency in long, continuous runs.

"Our film thickness monitoring system, "Tempe", was developed to stabilize OLED device performances, for its material characterization capabilities, and for in-situ, self-regeneration properties," says Scott Grimshaw, CTO and co-founder of Colnatec. "At the same time, "Tempe" has the potential to increase run-time, decrease downtime, and significantly reduce overall costs. We are confident of outstanding results of our system in the continuous OLED production at Novaled."

"OLEDs absolutely need accurate layer sizes, since without temperature compensation, the device performance is directly affected," says Kai Gilge, Head of Novaled's Engineering Division. "After positive pre-tests we are now about to implement Tempe in our continuously run OLED production. The new sensor system of Colnatec will help to speed up our development time for OLED prime materials for our OLED display and lighting customers."

About Colnatec LLC

Colnatec designs, develops and manufactures state-of-the-art sensors and electronic instrumentation used in the production of CIGS thin film solar cells, organic light emitting diode (OLED) displays and lighting, and high speed electrical devices. Through the use of patented and patent-pending technologies, researchers, manufacturers and system builders are able to increase the conversion



efficiency of photovoltaic films, increase production run times, lower costs, improve overall performance, and ultimately increase yield. Funded in part by Phase I and Phase II Small Business Innovation Research (SBIR) grants from the US Department of Energy (DOE), Colnatec is also an inaugural winner of the 2011 Arizona Commerce Authority Innovation Challenge Grant. As part of the DOE SunShot Program, they are members of the DOE Small Business and Clean Energy Alliance Partnership. For more information, visit <http://colnatec.com>, (480) 634-1449, or sales@colnatec.com.

About NovaLED

NovaLED AG is a leader in the research, development and commercialization of technologies and materials that enhance the performance of OLEDs (organic light-emitting diodes) and other organic electronics. NovaLED offers OLED product manufacturers a unique combination of proprietary technology, materials and expertise, and is currently the only company in the OLED industry licensing and selling organic conductivity doping technology and materials for use in the commercial mass production of display products. NovaLED has developed strategic partnerships with key OLED innovators and producers throughout the world and, with a broad portfolio of more than 500 patents granted or pending, has a strong IP position in OLED technologies, structures and materials. Commercially active since 2003, NovaLED was founded in 2001 as a spin-off of the Technical University and the Fraunhofer Institute of Dresden. NovaLED is headquartered in Dresden with sales offices in Korea and Japan. For more information, please visit www.novaLED.com.

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