
Blue LED Invention Receives The 2014 Nobel Prize In Physics

By Kristen Burkhardt / November 14, 2014

The Royal Swedish Academy of Sciences has awarded the 2014 Nobel Prize in Physics to Isamu Akasaki, Hiroshi Amano, and Shuji Nakamura, who collaborated in the blue light-emitting diodes (LED) invention that enables efficient production of brilliant and energy-saving white light sources.

The committee recognized this breakthrough technology, which revolutionized electronic displays and residential and commercial lighting in early 1990s when semiconductor materials and fabrication techniques emerge.

In the middle of the 20th century, LED has become a mainstream lighting solution to generate white light in incandescent bulbs, and has been used in modern applications such as smartphones, data storage, high-speed networking, water filtration, and home lighting. However, like any other innovation, LED light technologies had to face underlying challenges on its usefulness in most laboratories and its advancing applications.

Nevertheless, through the collaborative experiments of the three 2014 Nobel laureates, the obstacles towards the LED lighting has finally come to an end. Pioneered by Prof. Amano, who owns a laboratory fully equipped with high-quality analytical instruments including dispersive X-ray microanalysis system and JASCO's FT6000 FT-Raman system, together with Asaki, successfully created a gallium nitride required to create semiconductor materials for producing blue light.

Following the innovation of the blue LED technology, Nakamura conducted further experiments and perfected some aspects of the gallium nitride production process by growing structures with layers of the gallium nitride alloys at varying temperature ranges.

Modern innovations with practical applications that span across the cutting-edge fields of materials science, physics, and chemistry such as this "tour de force" blue LED technology depend on state-of-the-art optical systems for analytical research. JASCO takes pride in providing Prof. Amano with the FT/IR-6000 Raman spectrometer equipped with photoluminescence feature coupled with step-scan interferometers leveraged with high-speed silicon detectors for high-precision measurement of external light sources.

In other news, Amano together with three colleagues, T. Nishitani, T. Meguro, and M. Tabuchi, participated in the International Semiconductor Device Research Symposium 2013 in Maryland, U.S. to showcase another invention, "Novel Electron Source using Wide Band Gap Semiconductor Photocathode with an NEA surface. In the same year, JASCO was thrilled to support Amano and his team at the 26th International Microprocesses and Nanotechnology Conference in Sapporo, Japan.



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Kristen Burkhardt has a Bachelor's degree in Marketing from York College of Pennsylvania. She is the current CD/Export Sales Coordinator/Marketing at JASCO.

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