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Crystalplex announces development of cadmium-free alloy gradient Sapphire™ quantum dots for optoelectronics uses

Pittsburgh, Pennsylvania, USA, May 20, 2016 – Crystalplex Corp., a pioneer in the development of high stability quantum dots, has announced a new development enabling increased brightness and color stability for LCD displays using cadmium-free *Sapphire*™ quantum dots.

Manufacturers of high-end consumer electronics, such as TVs and mobile devices, are turning to quantum dots (QDs) to enrich the brightness and color quality of their LCD displays. The availability of stable, cadmium-free quantum dots is expected to accelerate the adoption of QD technology in consumer electronic devices, as cadmium is a regulated material in many countries.

Today, Crystalplex Corp., a 12-year-old nanoparticle R&D concern, announced it is now capable of making commercial quantities of cadmium-free *Sapphire*™ QDs based on the company's existing platform of alloy gradient QDs. The Company also announced it received a Notice of Allowance from the U.S. Patent and Trademark Office directed to the use of a sapphire shell to stabilize alloy gradient QDs. By using the patented alloy gradient nanocrystal structure without incorporating cadmium, these quantum dots can be passivated and protected with a transparent sapphire shell. The resulting nanocrystals are extremely bright, rivaling the brightness of cadmium-based nanocrystals. Moreover, this patent pending AIM™ shell isolates the QDs from the degrading effects of humidity and oxygen that limit their utility in optoelectronic applications

"Our alloy gradient *Sapphire*™ quantum dots have always been unique in the quantum dot world because they are all similar in size, shape, and mass," said Matt Bootman, Crystalplex's president and CEO. "Other approaches require tuning output wavelengths by changing the size or shape of the quantum dots. We tune the output based on the semiconductor ratios in our QDs, not their size. This difference allows us to reliably hit our target emission wavelength within 2 nanometers. We have now extended this reliable synthesis process to our new cadmium-free QDs."

Crystalplex is pursuing patent claims for the cadmium-free *Sapphire*™ QDs, alongside its existing estate of cases directed to alloy gradient QDs and other claims.

Lianhua Qu, Ph.D., chief technology officer of Crystalplex, explained, "Producing QDs of uniform size and shape allows us to deposit a very thin coating of aluminum oxide, about three or four atoms thick, to protect the QDs from the environment. This sapphire AIM™ shell provides stability and longevity to both our cadmium-bearing dots and the novel cadmium-free products we have developed. I am also very proud that the US Patent Office has given us a formal Notice of Allowance that our AIM™ patent will be issued shortly."

Polymer chemist Hunaid Nulwala, Ph.D., explained further that "the consistent aluminum oxide crystal structure of the AIM™ shell allows us to bind our QDs onto specific sites in our custom polymer. Doing so keeps the QDs evenly dispersed and well separated, avoiding clumping, to maintain the inherent brightness and efficiency of the QDs. This technology will allow development of inks, films, and thermoplastic molded parts containing *Sapphire*™ quantum dots."

"Simultaneously achieving these R&D milestones marks a watershed moment for the Crystalplex team," said Tom Petzinger, president and CEO of LaunchCyte LLC, Crystalplex's founder and largest shareholder. "By extending the stability of cadmium-bearing *Sapphire*™ QDs to a non-cadmium solution and by creating a custom polymer matrix to enable options for new optoelectronic designs, we see enhanced opportunities for component suppliers to serve the global display and lighting markets. We also expect these breakthroughs to accelerate adoption of QDs in many other optoelectronic applications, including high-end architectural lighting, agricultural lighting, and others."

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About Crystalplex. Crystalplex Corp. is a private firm with 12 years of R&D directed to quantum dot technology. The company maintains a fully integrated synthesis and pilot application plant in Pittsburgh, PA, USA.