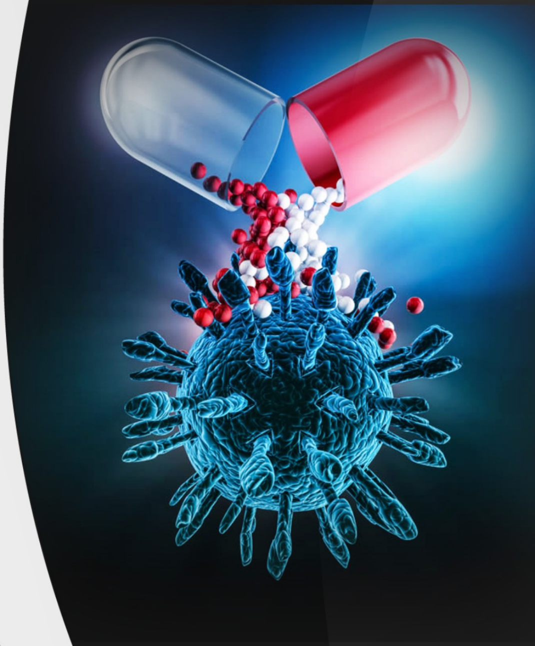
InP/ZnS Quantum Dots



We provide a wide range of InP/ZnS quantum dots with emission range from 500 nm to 800 nm. Due to large exciton Bohr radius, and high emitting efficiency, InP quantum dots present similar optical properties to II-IV type semiconductors quantum dots, including size tunable absorption and emission spectra in the visible and near infrared (NIR) wavelength range, but with reduced toxicity. The core-shell structured InP/ZnS quantum dots have uniform size distribution, high quantum yield and good stability, which can be applied to a variety of applications, such as biomarkers, photovoltaic devices, solar cells and LEDs.

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NEXT

Properties

of InP/ZnS Quantum Dots

Tunable color Emission

The emission frequency from QDs can be tuned to say arbitrary point from ultraviolet to near infrared wavelength range by changing particle size and/or chemical composition.

Highly Pure Color Emission

The emission spectra from QDs are narrow, symmetric, and without red-tail.

High Efficiency

To date, the quantum from efficiency (QY) of QDs can reach up to more 90%, some QDs have the QY nearly 100%.

Highly Bright

The emission intensity from single QDs is several hundred times higher than that of a single organic fluorescent dye

Easy Excitation

Qds have broad and continuous excitation spectra, allowing using a single source excitation to simultaneously excite multicolor Qds.

Large Stokes Shift

QDs Differ from organic fluorescent dyes by having large stokes shifts, avoiding the emission and excitation overlap during signal detection.

High Stability

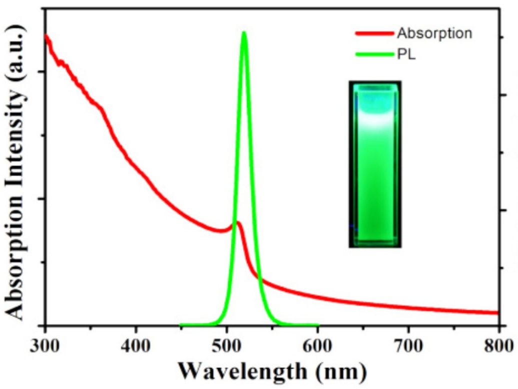
Unlike Organic Fluorescent dyes, QDs have strong resistance to photo-bleaching rate quickly, thus can be used for bio-imaging and photo-electronic devices.

Biocompatible

Through surface modification, QDs can be made to have low cytotoxicity and less harmful to organisum and biological living tags.

Technical Specification

Stock No.	Purity	Quantum Yield	Emission Peak	FWHM	Solvent
NS6130-12-000106	99.9%	50-80%	520nm	< 50nm	Toluene or customer required
NS6130-12-000107	99.9%	50-80%	550nm	< 50nm	Toluene or customer required
NS6130-12-000108	99.9%	50-80%	580nm	< 50nm	Toluene or customer required
NS6130-12-000109	99.9%	50-80%	610nm	< 50nm	Toluene or customer required
NS6130-12-000110	99.9%	50-80%	640nm	< 50nm	Toluene or customer required
NS6130-12-000111	99.9%	50-80%	660nm	< 50nm	Toluene or customer required
NS6130-12-000112	99.9%	50-80%	690nm	< 50nm	Toluene or customer required
NS6130-12-000113	99.9%	50-80%	720nm	< 50nm	Toluene or customer required
NS6130-12-000114	99.9%	50-80%	750nm	< 50nm	Toluene or customer required



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Applications

of InP/ZnS Quantum Dots

Bioimaging

The latest generation of quantum dots has great potential for use in biological analysis applications. The small size of quantum dots allows them to go anywhere in the body making them suitable for biological applications such as medical imaging and biosensors. They are widely used to study intracellular processes, tumor targeting, in vivo observation of cell trafficking, diagnostics and cellular imaging at high resolutions. Various kinds of organic dyes have been used in bioimaging for decades. However, with the advancement of nanotechnology, QDs have been considered to be superior to traditional organic dyes in many respects. For bioimaging applications, the fluorescent probes have to remain well-dispersed and stable in the aqueous medium with a wide range of pH and ionic strengths. Fortunately, numerous approaches have been developed to make the QDs water-dispersible. Up until now, great efforts have been devoted to employing QDs for in vitro and in vivo imaging, which are expected to be important to the diagnoses of many diseases, the understanding of embryogenesis, and lymphocyte immunology.

Photovoltaic devices

Because of the tunable of the absorption spectrum and high extinction coefficient, QDs are desirable for light harvesting, is beneficial for photovoltaic devices. QDs have the potential to boost the efficiency of silicon photovoltaic cells and lead to reduced costs. Quantum dots can offer a significant increase in efficiency, by using dots of varying sizes top of each other with the largest band gaps on top. Incoming photons will be transmitted until reaching a layer with a band gap smaller than the photon energy. With enough layers each photon will excite an electron with a band gap close to its own energy and thus waste a small amount of energy.

Light emitting devices

QDs are promising for light emitting devices and may improve the performance of light-emitting diode (LED), leading to the new design of "Quantum Dot light Emitting Diode". QDs are very useful for display devices considering their unique optical properties. They are capable of presenting visibly more accurate and outstanding colors.

Quantum computing

Quantum dots have paved the way for powerful 'supercomputers' known as quantum computers. Quantum computers operate and store information using quantum bits or 'qubits', which can exist in two states – both on and off simultaneously. This remarkable phenomenon enables information processing speeds and memory capacity to both be greatly improved when compared to conventional computers.

Solar cell

A quantum dot solar cell (QDSC) is a solar cell that uses quantum dots as the captivating photovoltaic material. It is used to replace bulky materials such as silicon, or copper indium gallium selenide. Quantum dots have band gaps that are adjustable through a wide array of energy levels by changing the size of the dots. Because the band gap of the quantum dots can be adjusted, quantum dots are desirable for solar cells. Frequencies in the far infrared that are characteristically difficult to achieve with traditional solar cells can be obtained using lead sulfide colloidal quantum dots. Half of the solar energy reaching the Earth is in the infrared region. A quantum dot solar cell makes infrared energy as accessible as any other.

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