

Ultra-Small Highly Fluorescent Near-IR Quantum Dots

Published date: Feb. 1, 2012

Technology description

Summary

This technology provides a process for synthesis of PbSe quantum dot clusters, which are highly fluorescent in the near infra red, of extremely small diameter (< 2 nm), and easily fabricated.

Description

This technology provides a process for synthesis of PbSe quantum dot clusters, which are highly fluorescent in the near infra red, of extremely small diameter (< 2 nm), and easily fabricated. In-vivo biological imaging in the near infrared, where there is reduced absorption of the light by biological fluids, down to the single molecule level, including deep tissue cancer imaging and intra-cellular diagnostics on a single protein or single copy level. These particular quantum dots have been found to have highly useful characteristics: Ultra-small (< 2 nm) diameter Fluorescence in the near infrared (700 - 1000 nm) Ultra-bright with fluorescence quantum efficiency in the range 40 - 84% Synthesis which does not require air-free techniques or elevated temperatures Synthesis can be done at high yields ($> 50\%$) in batch processing at a one liter scale Semiconductor quantum dots have potential to replace organic dyes for fluorescent imaging in the near infrared, where organic dyes emit poorly. But previous bio-compatible quantum dots have typically been 10 to 15 nm in diameter. As such they have been difficult to enter a cell through carrier-mediated mechanisms, whereas fluorescent dyes can easily be carried into the cell and nucleus. These new ultra-small quantum dots will be able to be used within cells. Other ultra small quantum dots have been made, but these have much lower fluorescence efficiencies, complex synthesis processes and are relatively unstable in air or water.

Institution

[University of Rochester](#)

联系我们



叶先生

电话 : 021-65679356

手机 : 13414935137

邮箱 : yeyingsheng@zf-ym.com