Quantum Dot Lasing in Liquid Solution (#3904)

A nanoparticle lasing complex that comprises a room temperature solution with quantum dots

Georgia Tech inventors have created a nanoparticle lasing complex that comprises a room temperature solution with quantum dots that each have an average diameter between 3 and 6 nanometers. All quantum dots in the solution are substantially the same size, and each quantum dot is capped with a capping material that passivates and protects the surface, maximizes the emission yield, reduces the line width of the emission from the quantum dot, and acts to suspend the quantum dot in the solution.

Benefits/Advantages

- Can report CdS in a room temperature liquid solution
- Allows for absorption and photoluminescence decay of the samples

Potential Commercial Applications

- Nanoparticle laser sensing

Background/Context for This Invention

Semiconductor nanocrystal quantum dots have attracted great attention due to their tunable electronic and optical properties arising from three-dimensional quantum confinement effects. As a direct wide band gap semiconductor, cadmium sulfide (CdS) nanocrystal quantum dots are an excellent candidate for realizing optical gain and ASE in the blue spectral range. However, until now, optical gain dynamics and measurement of optical gain lifetime have not been reported for CdS quantum dots and are certainly not for a solution of CdS quantum dots at room temperature. It would be advantageous to have lasing apparatus comprising CdS quantum dots in a room temperature liquid solution.

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More Information

U.S. Patent Issued - 7778301

Publications

For more information about this technology, please visit:
https://licensing.research.gatech.edu/technology/quantum-dot-lasing-liquid-solution

Images:

The automated sequential delivery of multiple fluids. A varying number of delay gates imprinted in the

branches are shown in the figure.

COVID-19 and flu saliva test on paper: (A) The automatic sequential delivery of multiple reagents required for virus test; (B) Water pouring into the device triggers the virus assay, allowing the presence of SARS-CoV-2 and influenza A & B viruses to be visually identified by the color changes in the corresponding detection spot