

# Quantum Dot Lasing in Liquid Solution

---

## **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.

### **Summary Bullets**

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

### **Solution 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 and More Information**

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.

### **Inventors**

- Dr. Mostafa El-Sayed  
Regents' Professor- Georgia Tech School of Chemistry and Biochemistry
- Wei Qian  
Research Scientist II – Georgia Tech School of Chemistry
- Qusai Darugar  
Research Assistant – Georgia Tech School of Chemistry

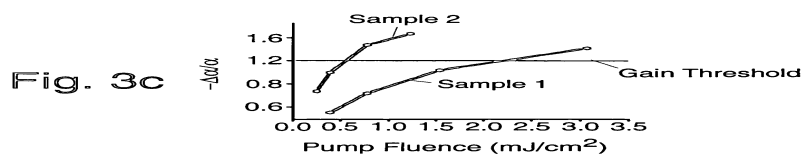
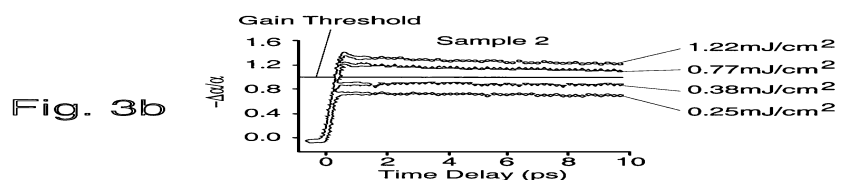
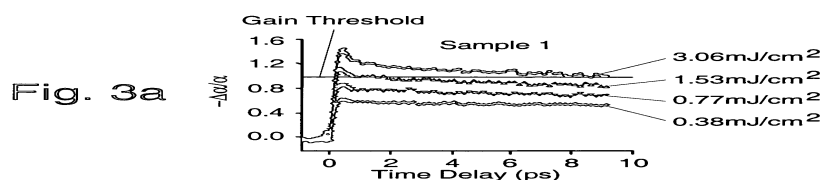
## IP Status

: US7778301

## Publications

, -

## Images



Visit the Technology here:

[Quantum Dot Lasing in Liquid Solution](https://s3.sandbox.research.gatech.edu//print/pdf/node/3507)

<https://s3.sandbox.research.gatech.edu//print/pdf/node/3507>