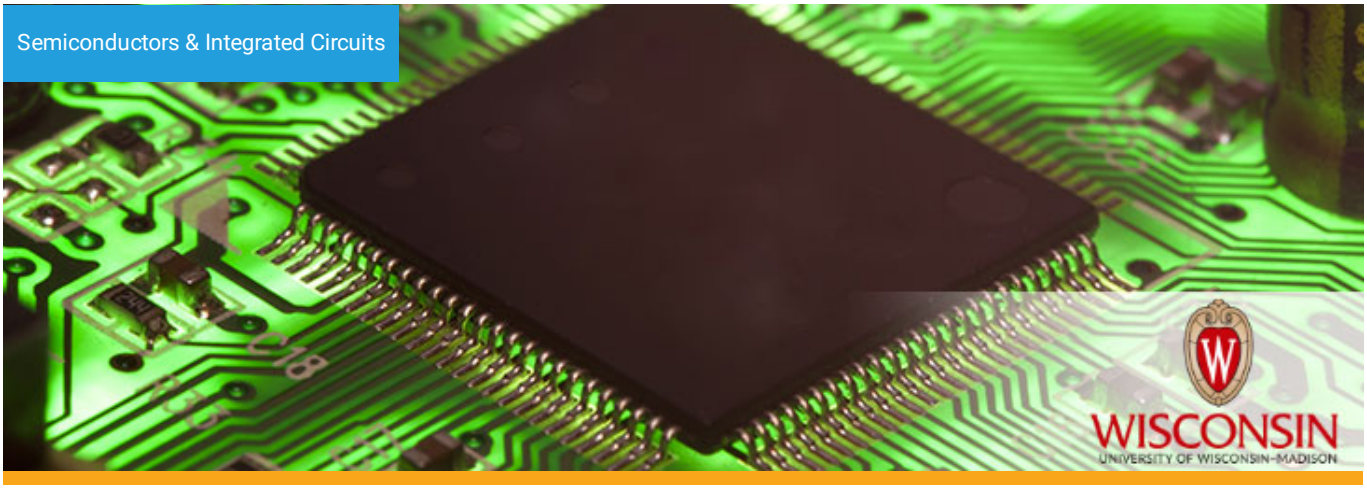

METHODS FOR FABRICATING QUANTUM DOT OPTOELECTRONIC DEVICES

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Overview

Compound III-V semiconductors are foundational materials employed for state-of- the-art optoelectronic devices. Planar ultra-thin heterostructure materials, called quantum wells (QWs), are currently the entrenched commercial technology for realizing high performance semiconductor based light emitters, such as light emitting diodes (LEDs) and laser diodes (LDs). Lower dimensional systems, such as Quantum Dots (QDs) have the potential to produce devices surpassing the performance of planar QW structures.

The Invention

UW-Madison Researchers have developed novel methods for fabricating quantum dot (QD) optoelectronic devices, e.g., light emitting diodes (LEDs) and laser diodes (LDs). The QDs of the optoelectronic devices are multilayer heterostructures of alternating quantum barrier layers and quantum well layer(s) composed of, e.g., III-V semiconductors. The new methods employ nanopatteming along with selective area (SA) growth, in situ selective area (SA) etching, or both SA growth and SA etching, to provide QD optoelectronic devices which provide advantage such as high density of monodisperse QDs; high radiative efficiency; and extended emission wavelengths. The methods further enable cost-effective large area processing. As a result, the QD optoelectronic devices may be used in a variety of applications including solid-state lighting, displays, high-density storage, telecommunications, detectors, etc.

Additional Information

For More Information About the Inventors

- Luke Mawst
- Padma Gopalan

Tech Fields

- Semiconductors & Integrated Circuits : Quantum dot technologies

For current licensing status, please contact Michael Carey at mcarey@warf.org or 608-960-9867

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