

Tuning the properties of exciton complexes in self-assembled GaSb/GaAs quantum rings.

ABSTRACT

Type-II self-assembled GaSb/GaAs nanostructures have been grown by molecular-beam epitaxy and studied by atomic-force microscopy, transmission electron microscopy, and power-dependent magnetophotoluminescence. Nanostructures on the sample surface are found to be entirely dotlike, while capped nanostructures are predominantly ringlike. Moreover, an in situ anneal process applied after thinly capping the dots is shown to enhance the severity of the rings and relax the strain in the matrix in the proximity of the GaSb, resulting in a change to the spatial configuration of the exciton complexes and their optical properties.

Keyword: GaSb/GaAs; Quantum dots; Quantum rings.