Abstract Submitted
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Morphological study on dot-chains using molecular beam epitaxy and *in-situ* scanning tunneling microscopy[1] HAEYEON YANG, DONGJUN KIM, EDWARD EVERETT, RICHARD WILSON[2], Utah State University, NANOPHOTONICS TEAM — We report scanning tunneling microscopy (STM) study on nano dots with a linear alignment. Strained but flat InGaAs epilayers were grown on nominal (001) surfaces of GaAs substrate by molecular beam epitaxy (MBE) at low temperature below 400 $^\circ$C. Real-time reflection high energy electron diffraction observations suggest that the strained surfaces are crystalline during the deposition process. *In-situ* scanning tunneling microscope (STM) shows that the strained surfaces are atomically flat but the surface reconstructions are not uniform, mixed with various structures. Upon heating the strained layers above 450 $^\circ$C under arsenic pressure, the strained layers undergo roughening transition, resulting in nanodots. The nano dots were formed very closely along a line to form dot-chains during the annealing process. The alignment lines are mostly along the [1-10] azimuthal direction and some within 35 degrees off the [1-10] azimuthal direction. Furthermore, the size and shape of dots depend on the annealing temperature and strain amount. Effect of strain amount and the annealing temperature on the morphology of dots will be discussed.

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