III-V semiconductor nanowires

- Novel nanostructures by bottom-up methods -

Motivation

Bottom-up material fabrication approaches are expected to provide a solution to the inevitable size limitation of top-down approaches. Our approach based on free-standing self-formed nanowires is promising for future optical and electrical nanodevices.

Originality

Free-standing nanowires are grown by a vapor-liquid-solid (VLS) method using metal particles as catalysts. Nanoscale heterostructures as well as pn junctions are achieved by this method. We have demonstrated the growth of novel three dimensional structures by combining the VLS growth and metal organic vapor phase epitaxy.

Impact

Successful control of the nanowire growth leads to highly-functional and/or low-cost devices. In addition, novel physical phenomena owing to quantum effects are expected to emerge in these nanostructures, which are applied to quantum information processing and quantum computing.

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