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Ion Beam Synthesis of InAsN Nanostructures X. WENG, P.T. WANG, R.S. GOLDMAN, Department of Materials Science and Engineering, University of Michigan, Ann Arbor, MI 48109-2136, Y.Q. WANG, Materials Science and Technology Division, Los Alamos National Lab, Los Alamos, NM 87545 — We recently demonstrated the utility of ion-beam-synthesis for producing light-emitting GaAsN nanostructures [1]. Here, we report the ion-beam-synthesis of InAsN nanostructures, using low temperature N implantation into epitaxial InAs. 100keV N ion implantation, with a dose of $5x10^{17}cm^{-2}$, leads to complete amorphization of a $\sim$300nm thick surface layer. Following annealing, this layer transformed into three layers: a nanostructure layer containing $\sim$5nm zincblende InN-rich InAsN crystallites within an amorphous matrix, a polycrystalline layer consisting of $\sim$100nm InAs-rich InAs:N crystals and amorphous domains, and layer of solid-phase epitaxially grown InAs. These results suggest that ion-beam synthesis is promising for producing InN-rich nanostructures or/and InAs-rich alloys. We will also discuss the effects of implantation and annealing conditions on the structure and properties of ion beam synthesized InAsN nanostructures. [1] X. Weng. R.S. Goldman, et al, J. Appl. Phys. 92, 4012 (2002); Appl. Phys. Lett. 85, 2774 (2004).

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