

Abstract Submitted
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Structural and magnetic properties of GaAs-MnAs nanowires grown by MBE¹ A. SIUSYS, A. RESZKA, P. DZIAWA, B.J. KOWALSKI, P. DLUZEWSKI, H. PRZYBYLINSKA, M. SAWICKI, Institute of Physics, Polish Academy of Sciences, Warsaw, Poland, J. SADOWSKI, MAX-Lab, Lund University, Lund, Sweden, Institute of Physics, Polish Academy of Sciences — Ferromagnetic (FM) Nanowires (NWs) have been proposed recently as a base of a new type of nano-magnetic memory structures. In this context, the investigations of NWs combining FM materials with commercially used semiconductors (SCs) like Si or GaAs are desirable. NW structures of GaAs combined with (Ga,Mn)As FM SC and MnAs FM metal were grown by MBE. Primary core GaAs NWs growth was induced by different nanocatalysts on two substrates for comparison reasons: by the autocatalytic growth mode on Si(100), Si(111) and by Au nanodroplets induced catalytic growth on GaAs(111)B. In both cases NW cores of GaAs were grown at high temperature (550 C for GaAs(111)B and 600 C for Si). The (Ga,Mn)As and MnAs shells were grown on both types of primary GaAs NW cores at low temperature (250 C). Structural properties of the core-shell GaAs-(Ga,Mn)As NWs were investigated by electron microscopy (SEM, TEM) and magnetic properties were studied by SQUID magnetometry and FM resonance. The NWs grown on GaAs(111)B are thinner (50 nm), shorter (3 microns) and denser than the NWs grown on Si (typical diameters of 100 nm, lengths up to 15 microns). The FM behavior observed in these NW structures up to room temperature is related rather to MnAs nanoclusters than to individual NW.

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