

# Magnetic and structural study of (ZnTe)/Co core-shell nanowires grown by MBE

P.A. Misiuna,<sup>1</sup> T. Wojciechowski,<sup>1</sup> P. Dłużewski,<sup>1</sup> B. Kurowska,<sup>1</sup>  
M. Wiater,<sup>1</sup> S. Lewińska,<sup>1</sup> A. Ślawska-Waniewska,<sup>1</sup> A. Wawro,<sup>1</sup>  
E. Milińska,<sup>1</sup> T. Wojtowicz,<sup>1</sup> and L.T. Baczewski<sup>1</sup>

<sup>1</sup>*Institute of Physics Polish Academy of Sciences, Warsaw, Poland*

The aim of this work was to obtain and characterize a model object for magnetic anisotropy study – (ZnTe)/Co core-shell nanowire. Arrays of crystalline ZnTe nanowires covered with cobalt were grown by molecular beam epitaxy in the two-step growth. Firstly, vapor-liquid-solid mechanism was used to obtain nanowires of diameters from 30 to 70 nm and length around 1  $\mu\text{m}$ . The second step involved covering the nanowires with Co shell of different thicknesses. Structural characterization of such structures was performed using scanning electron microscopy, transmission electron microscopy and energy dispersive X-ray spectroscopy techniques. Deposited cobalt has a polycrystalline structure. With the increment of Co deposition thickness the initial roughness of ZnTe core leads to a quasi-dendritic shape of Co shell. Vibrating sample magnetometry magnetic and force microscopy experiments revealed that magnetization easy-axis direction is perpendicular to the long axis of the nanowires, which is in agreement with theoretical predictions [1].

[1] K. M. Lebecki et. al. *Physica B: Condensed Matter* (2008), 403(2-3), 360–363.