Magnetotransport Properties of the $MoTe_2$ Layers Grown by Molecular Beam Epitaxy

Z. Ogorzałek[1],
A. Kwiatkowski[1], J. Sadowski[1,2,3], W. Pacuski[1], K. Korona[1], S. Kret[2], M. Grzeszczyk[1], R. Bożek[1], J. Binder[1], D. Wasik[1], M. Gryglas-Borysiewicz[1]

[1]Faculty of Physics, University of Warsaw, Pasteura 5, Warsaw, Poland
[2]Institute of Physics, Polish Academy of Sciences, al. Lotników 32/46, Warsaw, Poland
[3]Department of Physics and Electrical Engineering, Linnaeus University, SE-391 82 Kalmar, Sweden

The transition metal dichalcogenides are promising materials due to their unusual magnetic, optical and electronic properties. As it has been recently shown, Weyl semimetal including $MoTe_2$ can exhibit carrier mobility of 4000 $cm^2/V\cdot s$ and giant magnetoresistance (MR) of 16 000% in a magnetic field of 14 T at 1.8 K [1]. Most of transport results for $MoTe_2$, a relatively unexplored transitional metal dichalcogenide, are obtained on mechanically exfoliated samples and concern only temperature dependence of resistance [2-3]. Nowadays, there is a substantial progress in obtaining $MoTe_2$ by thin-film epitaxy or deposition [4-8]. In this paper, we present the studies of the $MoTe_2$ layers grown by molecular beam epitaxy (MBE). As it is well known the substrate is of critical importance for the electronic properties of thin 2D layers. We have studied the role of substrates using two their types: Al_2O_3 and SI-GaAs [111B], the latter commensurable with $MoTe_2$ lattice. An appropriate choice of growth temperature allowed us to switch between 2H and 1T' politypes. It also influenced the sample morphology, changing it from regular plane to nanowires. Magnetotransport properties of the layers will be presented and the impact of substrate will be discussed.

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