THERMOELECTRIC POWER IN EPITAXIAL $Ga_{1-x}Mn_xAs$ FILMS

M.V. Radchenko, G.V. Lashkarev, V.I. Sichkovskyy, V. Osinniy[1], *T. Story*[1], *J. Sadowski*[1,2]

Institute for Problems of Material Science,
Nat. Acad. Sci. of Ukraine
(*3, Krzhyzhanivskogo Str., Kyiv 03180, Ukraine*),
[1]Institute of Physics, Polish Academy of Sciences
(*32/46, Al. Lotnikow, Warsaw 02-668, Poland*),
[2]Max-lab, Lund University
(*Lund SE-221 00, Sweden*)

S u m m a r y

The thermoelectric power (TEP) in epitaxial $Ga_{1-x}Mn_xAs$ (x =0.03÷0.055) films 0.3 to 3 μm in thickness grown by the low-temperature molecular-beam-epitaxy (LT-MBE) technology on semi-insulating GaAs (100) substrates has been measured in the temperature range 10—300 K. The current carriers (holes) in the films under investigation had the concentration of $(1 \div 4) \times 10^{20}$ cm^{-3} and possessed the mobility of $1 - 10$ cm^2/(V $\times$ s). The analysis of the temperature dependences of TEP brought us to the conclusion about the presence of three contributions to the total TEP value, namely, the standard diffusion, ferromagnetic contribution, and exchange one. The model of a non-uniform distribution of magnetic phases has been considered for the film consisting of a paramagnetic phase and ferromagnetic clusters.