9.7 cm

EFFECT OF Fe- and Ni ION IMPLANTATION ON THE MAGNETORESISTANCE OF $La_{0.7}Sr_{0.3}MnO_3$ THIN FILMS

E. S. Vlakhov[a,d], E. Wieser[b], K. A. Nenkov[a,c,d], R. Groetzschel[b]

[a] Institute of Solid State Physics, Bulgarian Academy of Sciences, 1784 Sofia, Bulgaria
[b] Institute of Ion Beam Physics and Materials Research, Forschungzentrum Rossendorf e.V., D-01314 Dresden, Germany
[c] Institut für Festkörper- und Werkstofforschung Dresden, D-01171, Dresden, Germany,
[d] International Laboratory of High Magnetic Field and Low Temperatures, 53-529, Wroclaw, Poland

Implantation of ^{56}Fe and ^{58}Ni ions with low and moderate doses is employed to create point defects and lattice disorder as well as doping by Fe or Ni in order to study their influence on the magnetoresistance of $La_{0.7}Sr_{0.3}MnO_3$ thin films deposited by magnetron sputtering. Twostep ion implantation was carried out to distribute the implanted species across the whole layer thickness. The total dose was divided in the relation 1:2.5 on the energies 120 and 350 keV and varied between 3×10^{13} cm^{-2} and 5×10^{15} cm^{-2}. RBS of He^+ ions in random and channeling directions was used to detect the radiation demage. With increasing implantation dose the temperature of maximum magnetoresistance shifts to lower values. The low temperature transition from metallic conductivity to an increase of resistivity with decreasing temperature and the strong scattering of the resistance values in this range observed for medium implantation doses will be dicussed in the frame of a phase separation model. Changes in the transport properies as result of a modified microstructure formed by recrystallization of the heavily implanted samples will be presented, too.

13.4 cm

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Corresponding author :
E. S. Vlakhov

Address for correspondence :
Institute of Solid State Physics, BAS
1784 SOFIA
BULGARIA

Email address :
evlakhov@issp.bas.bg