ELECTRON-PHONON INTERACTION AND BANDWIDTH IN THE THIN FILM $La_{0.7}Ca_{0.3}MnO_3$ UNDER PRESSURE.

V.P. Dyakonov[a,b], E.E. Zubov[b,c], V.I. Mikhaylov[b], S.F. Myronova[b], V.P. Pashchenko[b], K. Piotrowski[a], A. Szewczyk[a] and H. Szymczak[a]

[a]Institute of Physics, PAS, 02-668 Warsaw, Al. Lotnikow 32/46, Poland.

[b]A.A.Galkin Physico-Technical Institute, NASU, 83114 Donetsk, R. Luxembourg str. 72, Ukraine.

[c]Shevchenko State Pedagogical University, 91011, Luhansk, Ukraine

9.7 cm

The magnetic and transport properties of the thin film $La_{0.7}Ca_{0.3}MnO_3$ under pressure up to 2 GPa are studied. The temperature dependences of the resistivity$\rho(T)$ were used to find the residual resistance ρ_0, Curie temperature T_C and $\rho(T_C)$ as functions of the pressure. It was found the monotonous increase of T_C and decrease of both ρ_0 and $\rho(T_C)$ with increasing pressure. In the framework of the Holstein model with strongly correlated electrons, the diagrammatic method for the theory of magnetic and resistive properties of manganites has been developed. The ρ_0, T_C and $\rho(T_C)$ parameters as functions of the electron concentration n, bandwidth W and polaron binding energy ξ were calculated. A comparison of the calculated and experimental data gives the pressure dependence of the bandwidth and polaron binding energy. It was obtained that W is of order 1 eV and $\xi \approx 0.2W$. Under pressure W is increased and ξ is decreased. It correlates with similar results obtained in the two-site model study.

13.4 cm

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Corresponding author :

E.E. Zubov

Address for correspondence :

A.A.Galkin Physico-Technical Institute, NASU, 83114 Donetsk, R. Luxembourg str. 72, Ukraine.

Email address :

zubov@dyakon.fti.ac.donetsk.ua