THE ANISOTROPY OF THE ELECTRICAL RESISTIVITY AND THERMAL EXPANSION OF SINGLE CRYSTAL $DyNi_5$

E. Kačmarčiková[a], M. Reiffers[b], M. Mihalik[b], J. Kováč[b], A. Menovsky[c], J. Garcia Soldevilla[d] and J.C. Goméz Sal[d]

[a]Faculty of Sciences, University of P.J.Šafárik, Park Angelinum 9, SK-041 54 Košice, Slovakia

[b]Institute of Experimental Physics, SAS, Watsonova 47, SK-043 53 Košice, Slovakia

[c]Departamento de Fisica, Universidad de Oviedo, E-33007 Oviedo, Spain

[d]Van der Waals-Zeeman Institute, University of Amsterdam, 1018 XE Amsterdam, The Netherlands

9.7 cm

The intermetallic compound $DyNi_5$ crystallizes in hexagonal structure and undergoes the phase transition into antiferromagnetically ordered state. We report the results on the measurements of temperature dependence of the electrical resistivity $\rho(T)$, thermal expansion $L(T)$ and susceptibility $\chi(T)$ for single crystal sample in the temperature range 4.2 - 300 K. Residual resistivity ratios $RRR = \frac{\rho(300K)}{\rho_0}$ along the main crystalographical axis vary from 3.5 to 4.7. We have observed the maximum in $\rho(T)$ at $T_N = 12.5$ K which corresponds to the transition to the antiferromagnetically ordered state. The transition temperature is in an agreement with previous measurements. Taking into account Bloch-Grüneissen formula for electron-phonon contribution $\rho_{ph}(T)$ to $\rho(T)$ the anisotropic magnetic contribution $\rho_{mag}(T)$ has been determined. We have observed the anisotropic behaviour of $L(T)$ at low temperatures and the magnetic contributions to total $L(T)$ have also been determined.

13.4 cm

Subject category :

4. Rare Earths and Actinides, Alloys and Compounds

Presentation mode :
poster

Corresponding author :
M. Reiffers

Address for correspondence :
Institute of Experimental Physics
Watsonova 47
SK-043 53 Košice
Slovakia

Email address :
reiffers@kosice.upjs.sk