

PHYSICAL PROPERTIES OF $Zr_{50}Cu_{40-x}Al_{10}Pd_x$ BULK GLASSY ALLOYS

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We performed a study of the magnetic properties, the specific heat, the electrical resistivity and the hydrogen diffusion constant for a series of compositions $Zr_{50}Cu_{40-x}Al_{10}Pd_x$ ($x=0-7$ at.%). The compounds are nonmagnetic, conducting alloys, where the Pauli spin susceptibility of the conduction electrons is the only source of paramagnetism. The low-temperature specific heat indicates an enhancement of the conduction-electron effective mass m^* below 5 K, suggesting that the $Zr_{50}Cu_{40-x}Al_{10}Pd_x$ BGAs are not free-electron-like compounds. The electrical resistivities of the $Zr_{50}Cu_{40-x}Al_{10}Pd_x$ BGAs amount to about $200 \mu\Omega\text{cm}$ and show a small, negative temperature coefficient with an increase from 300 K to 2 K of 4%. The hydrogen self-diffusion constant D in hydrogen-loaded samples shows classical over-barrier-hopping temperature dependence and is comparable with others such systems.

[1] M. Wencka, M. Jagodič, A. Gradišek, A. Kocjan, Z. Jagličić, P.J. McGuinness, T. Apih, Y. Yokoyama, J. Dolinšek, J. Alloys Compd. 504 (2010), 16-21.

9.7 cm

13.4 cm

Subject category :

7. Applications

Presentation mode :

poster

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