Magnetic susceptibility of $(Tl_{0.5}Pb_{0.5})Sr_2(Ca_{1-x}Gd_x)Cu_2O_y$ superconductors

W.M. Woch[1], R. Zalecki[1], A. Kołodziejczyk[1], H. Sudra[2], and G. Gritzner[2]

[1]*Faculty of Physics and Applied Computer Science, AGH University of Science and Technology, A. Mickiewicza 30, 30-059, Kraków, Poland*
[2]*Institute for Chemical Technology of Inorganic Materials, Johannes Kepler University A 4040 Linz, Austria*

The bulk $(Tl_{0.5}Pb_{0.5})Sr_2(Ca_{1-x}Gd_x)Cu_2O_y$ superconductors with $x = 0.1, 0.2$ were prepared by wet chemical gel technique. The structure of the superconductor was determined as the Tl-1212 structure, similar to the structure of YBCO-123 superconductor, with the lattice parameters: $a=b=3.809$ Å and $c=12.117$ Å. The magnetic properties of the bulk $(Tl_{0.5}Pb_{0.5})Sr_2(Ca_{1-x}Gd_x)Cu_2O_y$ superconductors were characterized by the measurements of the real and imaginary parts of *ac* susceptibility as a function of temperature and both of *ac* and *dc* applied magnetic field. The peaks of imaginary part of susceptibility were shifted to the lower temperatures when the applied magnetic field was increasing. Taking advantage of the Bean model the critical currents of the samples were calculated. The temperature dependencies of the critical current were fitted using the power law: $J_c(T)=J_c(0)[1-T/T_c]^n$. The field dependence of critical current were analyzed within the Kim-type power law as well as with exponential relation from the percolation model.

Name of the presenting author (poster session II): Wiesław M. Woch
e-mail address: wmwoch@uci.agh.edu.pl
http://www.agh.edu.pl