Bulk wavelength-resolved specific photoconductivity measurement and localized states detection in photoconductive materials

J. Frejlich, N.R. Inocente-Junior, R. Montenegro, T.O. dos Santos, C. Molina and S. Rissi
State University of Campinas-UNICAMP, Institute of Physics-IFGW, Laboratory of Optics, Campinas-SP, Brazil

A.C. Hernandes and V.R. Mastelaro
USP-S.Carlos, IF, São Carlos-SP, Brazil

S. Messaddeq, Y. Messaddeq and I. Skripachev
UNESP,IQ, Araraquara-SP, Brazil

J.F. Carvalho
UFG, Department of Physics, Goiânia-GO, Brazil

J.C. Launay
University of Bordeaux1, ICMCB, France

We report the use of a new fully automatic instrument for the measurement of simultaneous wavelength resolved photocurrent and light absorption in bulk photoconductive material. Experimental data are processed in such a way to take into account the photocurrent and light distribution in the sample thickness in order to compute an absolute specific wavelength dependent photoconductive coefficient characterizing the sample. The wavelength dependence of such a coefficient shows discontinuities at the photonic energies where photoactive centers appear, thus enabling detecting these active localized states in the material band gap. The present instrument operates in the 1.2-3.2 eV range but it is possible to extend its range somewhat further into the IR and UV domains. We report the use of this technique for characterizing poorly photoconductive materials like photorefractive crystals and also photoconductive glasses.

(This work was partially funded by FAPESP, CNPq, CAPES and UNICAMP)