A Diamond Film-based Beta Radiation Sensor

Javier Morales
Universidad Autonoma de Nuevo León
tequilaydiamante@yahoo.com.mx

Javier Almaguer
Universidad Autonoma de Nuevo Leon
almagerjavier@gmail.com

Victor M Castaño M
Universidad Nacional Autonoma de Mexico
meneses@servidor.unam.mx

Abstract

Diamond films exhibits excellent properties as high thermal conductivity and low electrical conductivity, due to phonon phenomena. Also, its strong valence bonds allow gap values up to 5.4 ev. When diamond films are exposed to beta radiation, some electrons move from the valence band to the prohibited band, higer than Fermi equilibrium line. In this new energetic state the electrons lies for a long time until diamond is heated , thus, the electrons go back to the valence band following a Weibull distribution [1]. In this work an algorithm to estimate beta radiation dose is developed considering the inverse problem for the Weibull distribution, the measurement of three temperatures and thermoluminescence experimental data. Showing the use of diamond thin films as beta radiation sensor.

References

1. Javier Morales-Castillo and Jonás Velasco and F-Javier Almaguer and Roberto Soto-Villalobos and V.M. Castaño. Thermoluminescence analysis and estimation of the kinetics parameters by the Weibull distribution in a diamond like carbon Film. © Springer-Verlag Wien 2013 Computing DOI 10.1007/s00607-013-0296-2.