

Polymer/ceramic composite: A large range radiation detector

W. K. Sakamoto¹; G. P. Estevam²; A. A. de Carvalho²; W. Pontes²; W. L. B. Melo³.

¹São Paulo State University – UNESP – Campus de Ilha Solteira, Department of Physics and Chemistry – Polymer Group. Av. Brasil, 56, 15.385-000 – Ilha Solteira (SP) – Brazil, E.mail: sakamoto@dfq.feis.unesp.br

² São Paulo State University – UNESP – Campus de Ilha Solteira, Department of Electrical Engineer, Av. Brasil, 56, Ilha Solteira (SP), Brazil

³Empresa Brasileira de Pesquisa Agropecuária – Embrapa, Centro Nacional de Pesquisa, Desenvolvimento de Instrumentação Agropecuária, Rua XV de Novembro, 1452, 13560-970 – São Carlos (SP) Brazil.

Monitoring radiant energy, both ionizing and non-ionizing have attracted great attention in areas such as medical, military and non-military applications as fire detection and prevention and remote temperature measurements. Development of economically able material, which can detect radiation precisely and accurately, is the target. In the last two decades pyroelectric composite made of ferroelectric ceramic immersed in polymer matrix have been used as sensing element. Working as thermal transducer the composite sensor converts the non-quantified thermal flux into the output measurable quantity of electrical charge, voltage or current. In the present paper a modified lead titanate/poly (ether-ether-ketone) Pz34/PEEK composite film was characterized as radiation sensor from infrared to ortovoltage radiation energy range. Voltage responsivity for IR and the response of the sensor as a function X-ray energy fluence are presented, showing the ability of the composite material as radiation detector. In the energy fluence rate range of 6.30 to 37.20 W/m², the sensor response varies from 2.70 V to 0.80 V. The voltage responsivity follows the inverse law with the frequency.

Acknowledgement: To FAPESP and FUNDUNESP for financial support