World Academy of Science, Engineering and Technology
International Journal of Health and Medical Engineering
Vol:11, No:05, 2017

Directionally-Sensitive Personal Wearable Radiation Dosimeter

Authors : Hai Huu Le, Paul Junor, Moshi Geso, Graeme O'Keefe

Abstract : In this paper, the authors propose a personal wearable directionally-sensitive radiation dosimeter using multiple semiconductor CdZnTe detectors. The proposed dosimeter not only measures the real-time dose rate but also provide the direction of the radioactive source. A linear relationship between radioactive source direction and the radiation intensity measured by each detectors is established and an equation to determine the source direction is derived by the authors. The efficiency and accuracy of the proposed dosimeter is verified by simulation using Geant4 package. Results have indicated that in a measurement duration of about 7 seconds, the proposed dosimeter was able to estimate the direction of a 10μCi 137/55Cs radioactive source to within 2 degrees.

Keywords : dose rate, Geant4 package, radiation dosimeter, radioactive source direction
Conference Title : ICRPPD 2017 : International Conference on Radiological Physics and Radiation Dosimetry
Conference Location : London, United Kingdom
Conference Dates : May 25-26, 2017