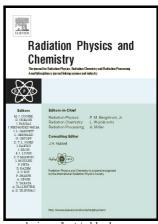
Author's Accepted Manuscript

Investigation of silica-based TL media for diagnostic x-ray dosimetry

Amjad. Alyahyawi, Z. Siti Rozaila, A.S. Siti Shafiqah, Siti Norbaini Sabtu, A Alsubaie, A. Alanazi, Eman. Daar, S.F Abdul Sani, D.A. Bradley



www.elsevier.com/locate/radphyschem

PII: S0969-806X(16)30825-8

DOI: http://dx.doi.org/10.1016/j.radphyschem.2016.12.018

Reference: RPC7348

To appear in: *Radiation Physics and Chemistry*

Cite this article as: Amjad. Alyahyawi, Z. Siti Rozaila, A.S. Siti Shafiqah, Sit Norbaini Sabtu, A Alsubaie, A. Alanazi, Eman. Daar, S.F Abdul Sani and D.A. Bradley, Investigation of silica-based TL media for diagnostic x-ray dosimetry *Radiation Physics and Chemistry* http://dx.doi.org/10.1016/j.radphyschem.2016.12.018

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

Investigation of silica-based TL media for diagnostic x-ray dosimetry

Amjad. Alyahyawi^{1,4}, Z. Siti Rozaila², A.S. Siti Shafiqah³, Siti Norbaini Sabtu², A.Alsubaie, ^{1,5} A. Alanazi^{1,6}, Eman. Daar^{1,7}, S.F.Abdul Sani², D.A. Bradley^{1,8}

¹Department of Physics, University of Surrey, Guildford, GU2 7XH, UK,
² Department of Physics, University of Malaya, 50603 Kuala Lumpur, Malaysia
³Department of Physics, International Islamic University Malaysia, 25200 Kuantan, Malaysia
⁴Department of Diagnostic Radiology, University of Hail, Hail, Saudi Arabia
⁵Department of Physics, Taif University, At- Al Khurmah branch, Taif 888, Saudi Arabia
⁶Cancer Centre, Prince Mohammed Medical City, 2254 Sakaka Aljouf 42421, Saudi Arabia
⁷ Department of Physics, Faculty of Science, University of Jordan, Amman 11942, Jordan
⁸Sunway University, Institute for Health Care Development, Jalan Universiti, 46150 PJ,
Malaysia

Key words: Ge-doped silica, thermoluminesence photonic crystal fibre, TLD, Chest imaging, dosimetry

ABSTRACT

We focus on the development of Ge-doped silica thermoluminescent dosimeters with sensitivity superior to that of the LiF (Mg,Ti) phosphors popularly used in x-ray diagnostic imaging dosimetry, typically in the form of the product TLD-100. Of interest are Ge-doped silica telecommunication fibres (SMF) and tailor-made doped photonic crystal fibres (PCFc), the latter Ge-doped or also co-doped with boron. The PCFs are formed of capillaries that at high temperatures and under vacuum are made to collapse inwards (PCFc), the internal walls fusing and generating strain-related defects. To-date, the fabricated PCFc-Ge-B, PCFc-Ge and (SMF) have been observed to provide TL yields which weight-for-weight are some 15, 10 and 2 × that of TLD-100. In present study we test the linearity of TL yield for x-ray doses from 0.1- to 10 mGy, use being made of an x-ray tube operated at 80 kVp, a value typically selected in chest radiography. For a dose of 10 mGy, a study of energy dependence has been

Download English Version:

https://daneshyari.com/en/article/5499056

Download Persian Version:

https://daneshyari.com/article/5499056

<u>Daneshyari.com</u>