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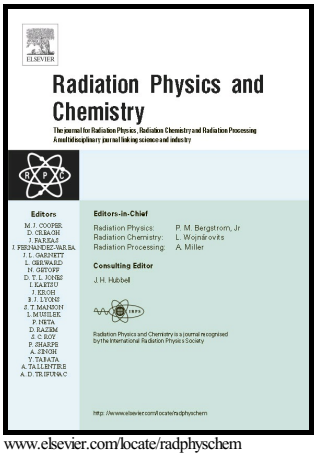

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Key words: Ge-doped silica, thermoluminesence photonic crystal fibre, TLD, Chest imaging, dosimetry

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