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# Materials2016 - Submission - View

**Abstract's title**: Rare-earth doped silica optical fibres for ionizing radiation detection

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Abstract

Scintillating silica optical fibre sensors have shown interesting results for ionizing radiation monitoring and therefore can be useful for dosimetry applications in medical field. In fact, they enable a remote, punctual and real-time dose assessment (Mones et al., 2008). In addition, the high radiation hardness that characterizes silica optical fibers, makes these systems promising for radiation detection in high energy physics experiments (Chiodini et al., 2014).

This work aims to review the recent progresses in the development and characterization of rare-earth doped silica fibres. The radioluminescent and dosimetric properties of Ce, Eu, Yb and Pr-doped silica matrices are described and the advantages and challenges in the use of these materials for dosimetry in medical and technical applications are shown.

In radiation therapy, an effective approach to deal with the stem effect, that is a spurious luminescent signal in the UV-VIS region due to the irradiation of the passive fibre (i.e. Cerenkov light and intrinsic fluorescence) must be considered. The opportunity to use Yb as dopant and to exploit its near infrared emission for the stem effect optical discrimination is presented (Veronese et al., 2014).

In the field of high energy physics, radioluminescent optical fibres could find applications in future detectors and calorimeters. The possible choice of Pr as dopant, in view of its fast scintillation time is described and discussed.

REFERENCE

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