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Printed thin layer photocatalytic dosimeter

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Abstract

Almost one half of human population suffers from vitamin D insufficiency. This vitamin is possible to be supplied by food and drugs but the most natural source of vitamin D is the irradiation of skin by UV-B light (290–320 nm). On the other hand, UV-B light is the strongest carcinogenic component of natural sun radiation. A solicitous monitoring of body exposure in various situations is a required information for targeted dosing of phototherapy and also for an appropriate application of photo protective precautions – use of clothes and sunscreens. Patients with heavy photosensitivity need the means of personal warning dosimetry. Such dosimeter should be sensitive to UV-B radiation and reveal information about exposure dose through substantial colour change. In fact, optimally it should work as a memory element which transforms the continuous time axis to the cumulative form with any required precision. The sensing elements was completed on the basis of photochemical and photocatalytic principles with auxiliary components. The dosimeter consisting of dispersed titania particels, dyes, solvents and additives was printed using roll-to-roll material printer on a polyethylene terephthalate foil. Suitable dyes selections for printed dosimeter were based on spectrophotometric measurements of thin printed layer of dosimeter. Radiometric calculations necessary for such printed dosimeter calibration will be also presented.

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