

Investigation of High-Radiation-Sensitive Normoxic Polymer Gel Dosimeter

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As increasing complexity of modern radiotherapy, more developing dosimetry is required. Polymer gel dosimeters offer a wide range of potential applications with high resolution and assured quality in the three-dimensional verification of complex dose distribution such as intensity-modulated radiotherapy (IMRT). However, polymer gel dosimeters are difficult to manufacture and handle, since they are toxic and sensitive to oxygen. Normoxic polymer gel dosimeter comprising tetrakis (hydroxymethyl) phosphonium chloride (THPC) with methacrylic acid (MAA) and gelatin has been developed to overcome these problems. The purpose of this study is to find the most sensitive and suitable gel for dosimetry by varying its composition ratio and its condition such as temperature during manufacturing. Polymer gels with various ratio of composition were irradiated with same amount of photon beam respectively. Various polymer gels were analyzed and compared with the software written in visual C++ which converts to R2 map images from TE images. Their sensitivities for photon beam according to their composition ratio were investigated. There was no dependence on beam energy nor dose rate, and calibration curve was linear. The polymer gel dosimeter developed in this study was suitable for dosimetry.

polymer gel dosimeter, three-dimensional verification, Normoxic polymer gel