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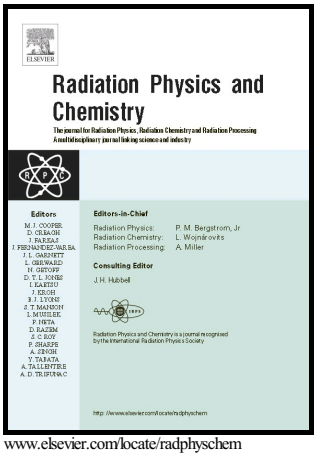

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Characterization of Makrofol® DE 1-1 for alpha particle radiography

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Abstract

Makrofol® DE 1-1 (bisphenol-A polycarbonate) was investigated for alpha particle radiography. The edge spread function (ESF) was measured by razor-blade's edge. Makrofol® DE 1-1 detectors were irradiated with perpendicular incident alpha particles of energy 2.5, 4 and 5.4 MeV, thereafter they were etched in 75% 6N KOH+25% C_2H_5OH at a temperature of 50 °C for different durations. The etched Makrofol® DE 1-1 detectors were imaged with an optical microscope equipped with a CCD camera. The results revealed that the green channel of the original RGB image provides the highest contrast comparing with red and blue channel by a factor of 27.6% of the original RGB image. The image contrast of alpha particle-irradiated Makrofol® DE 1-1 detector was found to be inversely related to the etching time since the alpha particle tracks proceed from a conical phase to spherical phase. The spatial resolution of alpha particle-irradiated Makrofol® DE 1-1 detector, in terms of line spread function, was found to deteriorate as the etching time increases for all examined alpha particle energies. The results revealed the potential capability of Makrofol® DE 1-1 detector as an efficient detector for alpha particle radiography such as autoradiography.

Keywords: Makrofol® DE 1-1, Alpha particle, Spatial resolution, Contrast, Edge spread function, Color channel level

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