

Sensitivity Of BANG® Polymer Gels To Light, Ultrasound And Shock Waves: Possible New Applications in Medicine.

BANG polymer gels¹ are increasingly being used for 3D dosimetry in conformal radiation therapy. In these gels, free radical products of water radiolysis initiate free radical chain polymerization of acrylic monomers which are dissolved in a hydrogel. This results in the formation of sub-micron size polymer microparticles which remain entrapped in the gel. As their number is proportional to dose, and as they scatter visible light as well as increase the water proton NMR relaxation rates, both MRI and optical CT scanning can be applied to imaging 3D radiation dose distributions in this class of gels.

This presentation reports preliminary results showing that at least two other types of physical interactions promote a similar response in the gel+monomer system. First, it is demonstrated that the gel responds gradually to the blue and ultraviolet components of light, and second, that exposure to 100kHz ultrasound as well as to acoustic shock waves such as those produced by a lithotripter, also results in the formation of the polymer particles in the gel, in proportion to the dose.

During the presentation the above results will be demonstrated and potential applications in photodynamic therapy (PDT) light dosimetry as well as in measurements of acoustic fields generated by lithotripters and ultrasound scalpels will be discussed.

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