



Radiation Chemistry of Biologically Compatible Polymers

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Abstract

Poly (2-hydroxy ethyl methacrylate) [PHEMA] and poly (2-ethoxy ethyl methacrylate) [PEEMA] are of biomedical and industrial interest due to their biocompatibility with living tissue. In this paper the effect of high energy radiation on these polymers is reported.

PHEMA and PEEMA have similar molecular structures to poly (methyl methacrylate) [PMMA], and the γ irradiation of this polymer is well understood. Hence the radiation chemistry of PMMA is used as model system for the the analysis of the radiation chemistry of these polymers.

The mechanism of the radiation induced chemistry of the polymers has been investigated using a range of techniques including electron spin resonance spectroscopy (ESR) to establish free radical pathways, GC to identify small molecule volatile products, NMR to identify small molecule radiation products and Gel Permeation Chromatography (GPC) to determine molecular weight changes.

Whilst much of the major part of the radiation chemistry can be attributed to similar reactions which can be observed in PMMA, there are a number of new radicals which are present as a result of the influence of the side chain interactions which reduces the mobility of the polymer chain.