

ABSTRACT

We will investigate the effect of γ -irradiation on the polymethyl methacrylate (PMMA) properties. The Fourier transform infrared spectroscopy technique in attenuated total reflexion mode (FTIR-ATR) results allowed us to show that the irradiated PMMA undergoes a scission in its lateral chain combined to an oxidation phenomenon. In fact, a decrease in the carbonyl index, versus the radiation dose, is observed. The differential scanning calorimetry and the thermostimulated depolarization currents revealed that the scission in the lateral chain provides a better flexibility to the PMMA chain and an increase in the free volume of the material. The consequences of these phenomena appear in the decrease of the activation energy of PMMA and the appearance of a local order in the material at a temperature T_c which decreases versus the radiation dose.