HU0300311

ESR STUDIES ON DEGRADATION PROCESSES IN POLYETHYLENETEREPHTALATE

M. Chipara[1], J. R. Romero[2], M. D. Chipara[1], L. Georgescu[3], L. Constantinescu[3], C. Secu[4], C. Morosanu[5]

[1]Indiana University Cyclotron Facility, Bloomington, Indiana, IN 47403, USA
[2]Central University of Venezuela, Caracas, Venezuela
[3]University of Bucharest, Faculty of Physics, Magurele, Bucharest, Romania
[4]National Institute for Materials Physics, Magurele, Bucharest, Romania
[5]National Institute of Plasma, Lasers and Radiation, Magurele, Bucharest, Romania

The generation of free radicals by degradation processes (thermal, plasma and radiation induced) is analyzed. Details regarding the generation of free radicals, their interactions, and kinetics, as revealed by electron spin resonance (ESR), with emphasis on laser beam degradation, are discussed. Some ESR lines of laser-irradiated polyethylene-terephtalate (PET), recorded at room temperature, are shown in Figure 1. The lines are narrow singlets located around g=2.003. The resonance line amplitude, width and double integral of the resonance line are affected by the power of the incident beam.

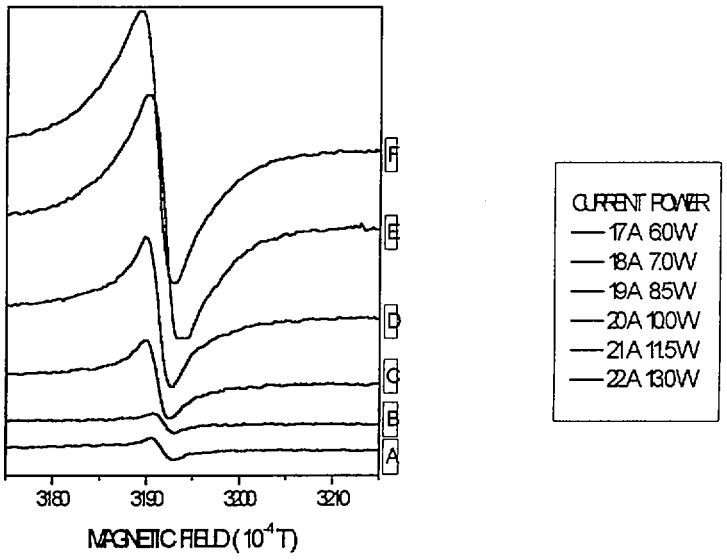

Figure 1. ESR spectra of laser irradiated PET at different incident power (A= 6.0 W, B=7.0 W, C=8.5 W, D=10.0 W, E=11.5 W, F=13.0 W)

The common features of these degradation processes (universal behavior) as well as the fingerprints of each degradation process are analyzed in detail.