CO_2 Laser Radiation effects on LDPE films of different compositions.

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Abstract

Polyethylene (PE) is the plastic most used in the world; is used as packing material by its excellent properties and high durability. Nevertheless, is a non-biodegradable material due to its high molecular weight. Therefore, there are many studies about how accelerate PE degradation to find solutions to reduce PE environmental accumulation.

Most of molecular weight and exact composition from commercial PE are confidential, because they are synthesized and manufactured under trademark. Each PE producer had its own manufacturing process, so, different commercial PE may have different composition and, therefore, different behavior when exposed to same treatments.

Low-density (LDPE) polyethylene films from different composition were exposed to CO_2 laser radiation at different fluences, time exposure and laser power, in order to characterize CO_2 laser effects; thermodegradation reactions cause changes in PE chemical and physical properties as main chain scissions and crystallinity due to heat generated by CO_2 laser radiation.

LDPE films exposed to CO_2 laser radiation show changes, mainly in crystalline phase fraction and in the branches of the polymer main chain. Branching index and crystalline phase fraction behavior, depending on fluence, time exposure and laser power; the variation in the composition of the films was also an important factor.

Recent Publications

A. Martínez-Romo, R. González-Mota, J. J. Soto-Bernal, and I. Rosales-Candelas. LDPE Oxidation by CO_2 Laser Radiation (10.6 μm). International Journal of Polymer Science. Vol. 2018, Article ID 5150673, 5 pages. https://doi.org/10.1155/2018/5150673.

Biography

Rosario González-Mota graduated from the Technological Institute of Aguascalientes as a Chemical Engineering and obtained a Ph. D. degree in Optical Engineering and Laser Technology from the Optical Research Center, Leon, Gto, México. Currently she is professor at the Technological Institute of Aguascalientes. Her research interest is related to optical properties of materials.

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