

TESTING AND EVALUATION METHODS FOR POLYMERS BIODEGRADATION

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The paper presents testing and evaluation methods for polymer biodegradation. Direct, indirect, as well as specific methods are presented.

Keywords: biodegradation; biodegradable polymers; testing methods; evaluation methods

1. BIODEGRADABLE POLYMERIC MATERIALS – GENERAL ASPECTS

The different properties of polymers, among which reduced density, chemical and electrical resistance, make them ideal materials for a great number of applications in a variety of domains. However, this leads to the accumulation of waste materials, which contribute to environment pollution.

One of the ways of limiting this phenomenon is to achieve biodegradable polymeric materials. Such materials may be obtained by using natural and synthetic biodegradable polymers, by chemical or biological modification of natural polymers, or by associating non-biodegradable polymers with highly biodegradable polymeric materials.

In addition to the need of avoiding environment pollution with polymer waste, the achievement of biodegradable polymeric materials became imperative due to some of their applications, which involve their including into living organisms (as surgical implants and sutures, controlled drug release polymeric systems etc.) [43].

The achievement and practical use of biodegradable polymeric materials involve the previous testing of their biodegradability. Polymers biodegradation may be tested and assessed in natural environments as well as in simulated ones, under aerobic or anaerobic conditions.

The generalized equation describing polymer biodegradation is [4]:



At present, there are several organizations that deal with the standardizing of the testing and evaluation methods of polymer biodegradation:

- American Society of Testing and Materials (ASTM), as part of American Normative Reference, with tests partial, inherent and ultimate biodegradation (or total biodegradation) (see Addenda) for insoluble polymers in water and plastic materials. In accordance with