CHARACTERIZATION OF RECYCLED POLY (ETHYLENE TEREPHTALATE)-ALUMINIUM COMPOSITES

RECIKLĒTU POLIETILĒNTEREFTALĀTA-ALUMĪNIJA KOMPOZĪTU DEFORMATĪVĀS ĪPAŠĪBAS

R. Merijs Meri, I. Elsknite, J. Zicans
Riga Technical University, Institute of Polymer Materials
A.K. Bledzki
Kassel Universität, Institut für Werkstoff, Kunstoff- und Recycligstechnik

Increasing industrial development and changing consumption patters have led to substantial accumulation of polymeric waste. Consequently in European Union the amount of plastic waste have increased by reaching 21 150 000 t in 2003. Important part from this huge amount is assigned to packaging, such as poly(ethylene terephtalate) (PET) bottles and films, high density polyethylene and polypropylene containers, low density polyethylene films, polystyrene disposable containers etc. Especially actual this problem is for PET packaging waste, considering high growth rate of the resin in the international market.

The actuality of the problem is highlighted by the fact that before 2 years only 7 countries, i.e., Germany, Austria, the Neatherlands, Belgium, Spain, Italy and Sweden, have met EU targets on packaging recycling. In spite of this EU demand for minimum plastics packaging recycling for EU-12 countries, should be met up to 31.12.2008, has been increased up to 22,5 %. Therefore, great importance should be devoted to increase of plastic waste recycling rates. Apart from this, attention should be devoted for development of new approaches in packaging recycling.

Until now, mechanical and chemical recycling are most widely used methods of secondary utilization of polymers. Chemical recycling technique is based on depolymerization of polymer macromolecules, allowing synthesis of new material from oligomers and monomers. This approach has gained acceptance in polymer concrete and mortar industry as well in production of paints and varnishes from polymeric waste. Mechanical recyling of polymers, in its turn, is based on reprocessing of used material without breaking its high molecular structure. This method is based on separating of individual polymers from the polymeric waste stream on the bases of differences in material physical properties (mainly density). Alternatively blends can be developed from plastic waste stream components. This approach not only allows successful utilization of polymer waste, but gives opportunity to develop broad spectrum of multifunctional material compositions, allowing consumer to choose best system for specific applications. Besides it, used plastic material can be successfully utilized as binder in such applications as polymer pavement stones, curbstones etc. In the same time direct recycling of waste materials into usable products have been always thought to be the best secondary utilization technique.

Considering previously mentioned, attention in the current investigation is devoted to elaboration of direct recycling method of metallized polyester packaging, such as PET trays and blister packages. In this context tensile deformative, rheological, and calorimetric properties of aluminized PET ecocomposites are investigated and compared with those of neat polyester resin. Results of the investigation show that aluminium behaves as specific filler, assigning the system increased strength, wear and other metal-related properties.

Remo Merijs Meri, post-graduate student, MSc,
RTU, Institute of Polymer Materials,
Address: Azenes 14/24, Riga LV 1048, Latvia
Phone: (+371) 708 9252
e-mail: zicans@ktf.rtu.lv