

RECYCLING POSSIBILITIES OF THE POLYESTER BASED POST-CONSUMER PRODUCTS

UZ POLIESTERU BĀZES VEIDOTO NOLIETOTO IZSTRĀDĀJUMU OTRREIZĒJĀS PĀRSTRĀDES IESPĒJAS

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Summary. Technologies for recycling of (1) single material containing post-consumer products, (2) multiple polymeric components comprising used commodities and (3) inorganic ingredients containing post-consumer plastics wares are discussed. Mechanical, thermal and rheological properties of the developed compositions are determined.

Due to remarkable growth of waste, necessity to recycle post-consumer materials sustainable becomes more and more important. Especially aware this problem is for polymer materials, which are extensively used almost everywhere. Many of the secondary utilization methods of polymer materials, which have been more or less extensively used at present, i.e., mechanical recycling, chemical recycling, thermal treatment, biological digestion and others, have certain limitations. Great diversity of consumer and industrial products as well as variability of the solid waste stream makes it difficult to choose technologically and economically most appropriate method for recycling of polymer waste. Most important criteria are technological simplicity and economical feasibility of the secondary recycling process that can be achieved by using traditional methods applied in polymer material processing industry, such as extrusion, compression molding, thermoforming, blow molding etc.

In this research extrusion based recycling technology is developed for secondary processing of (1) single material containing post-consumer products, (2) multiple polymeric components comprising used commodities and (3) inorganic ingredients containing post-consumer plastics wares. Most important technological parameters for pre-treatment and consequent processing of secondary materials are determined. Modification possibilities of secondary materials by means of elastomer and compatibilizer addition have been evaluated. Mechanical, thermal and rheological properties of the investigated materials have been determined.

Results of the investigation show that extrusion based recycling technology at certain technological processing parameters can be successfully used for processing of both neat polymeric components, and those containing relatively small amounts of inorganic ingredient. It was confirmed that compatibilization and elastomer addition are both effective in improving toughness of the secondary compositions. Simultaneously it should be mentioned that at certain elastomer content strength and stiffness of the investigated compositions remained practically unchanged in comparison to appropriate neat polymeric components.

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