P-4-775

EVALUATION OF THE EFFECTS OF DIFFERENT PROCESSING METHODS ON THE RHEOLOGICAL PROPERTIES OF THE POST-CONSUMER POLYPROPYLENE

P. S. Garcia[a], S. A. Cruz[a,*]

[a] *UFABC (Universidade Federal do ABC), Centro de Engenharia, Modelagem e Ciências Sociais Aplicadas, Santo André, São Paulo, Brazil.*

**Corresponding author: sandra.cruz@ufabc.edu.br*

Polypropylene (PP) is one of the most used thermoplastics worldwide, especially because its low cost and good mechanical properties. As consequence, it is often disposed by packaging industry, and it has been one of the major issues with municipal solid waste residues. Due to that, recycling of this polymer has become common practice, however, during the recycling, its structure can be changed by action of the thermo-mechanical degradation, as observed in many papers. The structure of the recycled PP can also change by action of residual contaminants present in it, but little is known about it, mainly when it involves different types of processing. In this work, the pellets of PP homopolymer were contaminated using a surrogate cocktail (chloroform, toluene, tetracosane and benzophenone) according to FDA (Food and Drugs Administration) guidelines, with the purpose of simulating the post-consumer PP. After that, they were recovered (washed and dried) and these same samples were submitted to three different extrusion processes: single-screw extrusion, single-screw cascade extrusion and double-screw degassing extrusion. In order to analyze the structural changes in the chains of PP that occur during the processes, under low and high shear rates, the rheological properties were investigated. The samples were tested in a rheometer with parallel plate geometry and in a capillary rheometer. It was observed the molar mass, using the Mark-Houwink equation to the melted polymer. It was also observed the complex viscosity (?*), the mass molar distribution (MMD), storage modulus (G´) and loss modulus (G´´). It was concluded in this work that the residual contaminants led to high degradation of the PP, mainly in the samples under high shear rate. In those same cases, the viscosity and the molar mass decreased and the mass molar distribution narrowed.