

Reuse of textile waste with nano reinforcement for the development of materials incorporated with nanocomposites

Mariana do Nascimento Sartori¹, Dione Pereira de Castro¹, Leonardo Gondim de Andrade Silva¹

¹Instituto de Pesquisas Energéticas e Nucleares (CETER)

e-mail: marianasartori@usp.br

The use of plastics in Brazil and the world has shown a growing demand due to their qualities, ease of obtaining, and low cost, and, consequently, produces an increase of these plastics in solid urban waste. The destination of these materials, especially in Brazil, is summarized in sending to landfills, incineration and, mechanical and chemical recycling. This study evaluates the possibility of using polyamide textile waste with elastane discarded by the textile industry, as reinforcement for the development of a polymer-clay composite, on a nanometric scale, and develop a recycling route for these materials. In that, the nanocomposite technology adds value to this material. This work used polyamides from textile waste of the industry. These materials were first processed in a compacting machine. Afterward the composites with 1, 2, and 3% in mass of Verde Clara clay/polyamide were prepared in a double screw extruder. The composites were characterized by techniques of X-ray diffraction (XRD), tensile, flexural, impact tests and thermogravimetric analysis (TGA). Results obtained were compared with the properties of the standard samples. As a conclusion of this study, it can be stated that the polyamide textile scraps with elastane can be reused forming nanocomposites with Verde Clara clay. Verde Clara clay in the proportion of 1% already confers gains in the properties of these nanocomposites.

Acknowledgments:
The authors would like to thank CNPq, FAPESP and CAPES for their financial support.