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Possibility of Obtaining High Quality Raw Materials

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Aim:

The traditional way of recycling plastics, the mechanic one (through melting), is the one that contributes most, so that plastic waste can return to the productive process. However, it is known that the mechanical recycling generates products with inferior quality when compared to the original polymer, once its main chain pass through a series of degradations during use and recycling.

The chemical recycling (through the use of solvents) has gained attention, because it is able to generate high quality final products after the deliberate destruction of the main polymeric chain, providing products with a low molar mass which can replace petrochemicals with little or no difference.

Findings:

As an example, almost 75,000 tons of polyethylene terephthalate (PET), mainly coming from discarded bottles, was chemically recycled in Brazil in 2015, providing raw materials so that unsaturated polyester and alkyd resins could be obtained. This rate stands for 28.6% of all recycled PET (260,000 tons) and almost 14% of all polymer consumed in Brazil on the same year (510,000 tons). Nowadays, one of the most promising chemical recycling is the reaction of PET with 2-ethyl-1-hexanol. Through this reaction is obtained Bis (2-ethylhexyl) terephthalate, used on the formulation of polyvinyl chloride (PVC), as a plasticizer, generating flexible PVC, which is used in pools, hoses, medical products, shoes, food packaging etc. Results indicate that both the plasticizer obtained through chemical recycling and the flexible PVC produced with it is high quality compounds when compared to the ones produced through a traditional route.

Note: This research was partly presented at 10th World Congress and Expo on Recycling scheduled during July 26-27, 2018 | Amsterdam, Netherlands