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Influence of the recycling in the mechanical and thermal properties of post-consumer polypropylene materials used as bumpers of cars

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Polypropylene materials used as bumpers of cars have been examined and compared after several mechanical recycling cycles consisting of alternating cycles of grinding, extrusion and injection. In order to investigate the influence of the recycling cycles on the material, the mechanical properties were studied by tensile testing according to the UNE-EN-ISO-527 standard and Impact testing (UNE-EN-ISO-179). Vicat temperature testing (UNE-EN-ISO-306) and Differential Scanning Calorimetry (DSC) were also performed. After the first recycling cycle the elongation at break and Young's modulus decrease considerably but successive cycles restore mechanical properties. No significant changes were detected in the thermal properties after several recycling cycles.

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The SHREDDERSORT project: LIBS and ANN for selective recovery of non-ferrous metal automotive shredder

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This paper reports the preliminary results obtained in the SHREDDERSORT project, a project funded by the European Commission aimed at developing a new dry sorting technology for non-ferrous automotive shredder. The non-ferrous fractions contain mainly aluminum, magnesium and copper alloys although sometimes also zinc-based alloys are found. These materials results after the non-ferrous separation (usually by an Eddy-current operation) and can be further sorted by hand-sorting or even by any kind of mechanical sorting process. The analyses have been realized in the Applied and Laser Spectroscopy Laboratory at CNR in Pisa using the Laser Induced Breakdown Spectroscopy (LIBS) technique in the perspective of the development of a dedicated instrument for on-line sorting operation. Different types of samples have been analyzed and in particular, different parameters have been studied to identify the optimum excitation conditions for the maximization of LIBS signal under double pulse excitation for instance changing the inter-pulse delays between the laser pulses (from 0 ns (coincident pulses) to 75 μ s) and the laser pulse irradiance. Finally, the LIBS spectra have been processed using an Artificial Neural Network approach in order to classify different kind of aluminum alloy using a set of certified samples.

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