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POLYMERIC WASTES FROM AUTOMOTIVES AS SECOND RAW MATERIALS FOR LARGE SCALE PRODUCTS

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Abstract

Efficient large-scale recycling of polymeric wastes for automotives is of increased interest from ecologic and economic point of view and represents an important goal for the car recycling industry. One alternative is to develop novel composite materials, relying on waste car parts, for indoor or outdoor large-scale applications, without using small molecular plasticizer or other additives but insuring a good compatibility for large percentages of thermoset plastics in the composite. Previous studies confirmed the possibility of obtaining composites with competitive mechanical properties by using only recycled tire rubber and plastics (HDPE and PET), by compression molding at optimized temperatures of 240-260 °C. The main problem to be solved is to identify solutions for developing good chemical or mechanic-chemical interfaces. Further optimization targets the reduction of the energy consumption, by reducing the curing temperature while preserving or enhancing the mechanical properties. The addition of small amounts of wood waste (sawdust) proves to be a viable solution and optimized composites (rubber-HDPE-PET-wood) with very good mechanical properties obtained at curing temperatures of 150…160 °C are reported. The interactions between components in the composites were investigated with Fourier Transform-Infrared (FTIR) analysis and were confirmed by the contact angle and surface tension measurements. The effect of the additives on the mechanical properties was evaluated by tensile and compression strength measurements. The impact of inorganic fillers on the structural organization of PET-rubber composites was studied using Atomic Force Microscopy (AFM).

Key words: composites, tire rubber, fly ash, PET, wood sawdust

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