

## RECYCLING AND REUSING POLYAMIDE 6 EXTRUDED WASTE PRODUCTS TO MANUFACTURE CARBON FIBER BASED COMPOSITES

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**Abstract:** *The work presents a study regarding the recycling of polyamide 6 products processed by extrusion/injection molding to be used as matrix in laminated composites reinforced with carbon fiber fabric (as-received and surface oxidized in laboratory). The results highlight the similarity between the recycled PA6 based carbon fiber composites and the reference samples based on pure PA6 and the two carbon fiber variants, in terms of mechanical performance at tensile and flexural loads, physical-chemical and morphological characteristics as well as fracture behavior. This confirms that PA6 waste products can be harnessed into products with high performance for different applications.*

**Keywords:** thermoplastic polymer, plastic materials recycling, carbon fiber composites, waste recovery.

### 1. Introduction

In the past decades, polymer based materials have found applications in more and more domains, from consumer goods and sport to construction, automotive and aeronautics industries. As expected, most products based on polymers do not have an endless lifetime of use and inevitably at some point they become plastic wastes. Considering the environmental issues of our millennium generated by waste, as most polymeric materials are not biodegradable or their degradation is very slow and can persist for hundreds of years [1], researches focus on limiting the generation of plastic waste, with the aim to minimize the use of resources and maximize recovery [2]. This signifies recovering both mechanical and feedstock

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