MECHANICAL PROPERTIES OF ABS REINFORCED WITH RECYCLED ELIUM THERMOPLASTIC COMPOSITE

Begoña Galindo[1], Rocío Ruiz[1], Pedro Gálvez[1], Pierre Gerard[2], Alexander Zoller[2] and Juan José Matarranz[3]

[1]Future and Sustainable Mobility Group, AIMPLAS, Valencia, Spain, [2]ARKEMA, Lacq, France, [3]Gestamp, Barcelona, Spain

Introduction

The transport industry is working on promising technologies to minimize fuel consumption and greenhouse effect emissions, while increasing the sustainability of the manufacturing processes. Thermoplastic composites (TPC) are a key technology to achieve these challenges thanks to their ability to be recycled, unlimited shelf life, and excellent mechanical properties in comparison with thermoset matrices [1]. Additionally, two mainstream wastes can be identified in the transport sector: the post-industrial waste generated during the manufacturing process and the post-consumer waste. Elium® is an acrylic reactive-thermoplastic resin that would allow the reuse of these materials wastes in transport secondary applications with full guarantee of life cycle sustainability.

Objectives

Quantify the effect of incorporating recycled Elium® TPC to virgin ABS in the mechanical properties as well as comparing its performance to commercial ABS compounds: virgin ABS (vABS), recycled ABS (r-ABS) and reinforced ABS with 20% glass fibre.

This study has been developed within the context of the EC-funded Recotrans [2] project, which aims at increasing the sustainability and reducing the production time and cost of RTM processes in the transport industry.

Materials and Methods

Grinding → **Compounding** → **Injection**

TPC Part

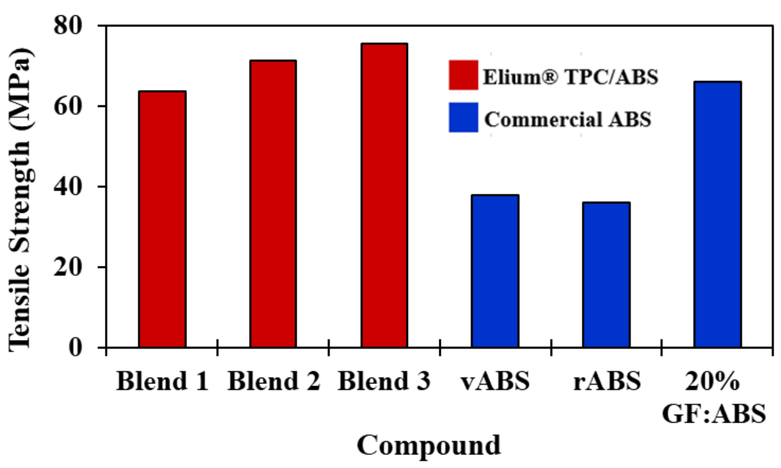
Leistritz Max 27 Co-rotative twin screw extruder

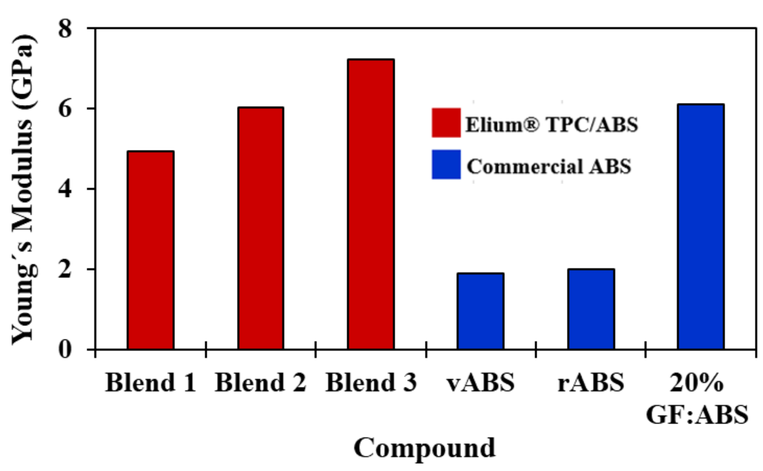
Blend ID	Elium®TPC	ABS
1	0.4	0.6
2	0.5	0.5
3	0.6	0.4

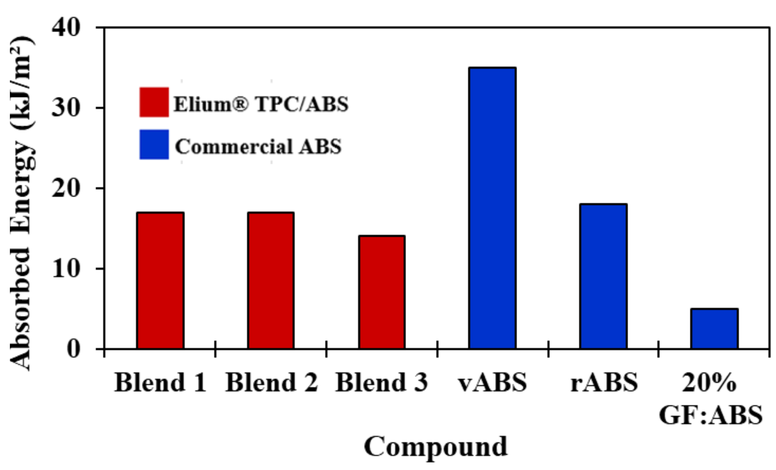
Arburg 420C 1000-350 Injection moulding machine

Tensile Test	UNE-EN ISO 527-2
Charpy Impact Test	UNE-EN ISO 179-1

Results and Findings







Conclusions

- The recyclability of Elium® based thermoplastics has been demostrated.
- The tensile strength and the Young´s modulus increase linearly with the increase of Elium® composite weigth content.
- Impact strength decreases as the weight content of Elium® composite increases.

Acknowledments:

This Project has received funding from the European Union Horizon 2020 Research and Innovation Progamme under Grant Agreement No. 768737.

References:

[1] S. Boria, A. Scattina, G. Belingardi “Experimental evaluation of a fully recyclable thermoplastic composite”. Composite Structures. Vol 140, pp 21-35, 2016

[2] https://recotransproject.eu/