Stress-strain curve analysis for the mixture of expanded polystyrene and polypropylene plastic waste

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Problem definition & objectives

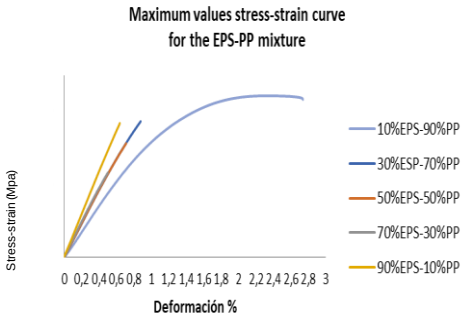
This research presents a stress-strain curve analysis for the mixture of expanded polystyrene (EPS) and polypropylene (PP), both recovered wastes, for the purpose of contributing to the physical-mechanical characterization of this mixture to develop future research projects to reincorporate this material in the recycling chain.

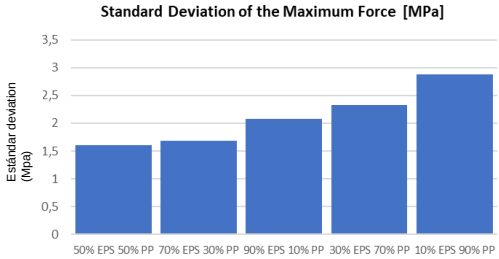
Methods

For this work, a mixture was made with EPS and PP with the following proportions: **90 % PP – 10 % EPS, 70 % PP – 30 % EPS, 50 % PP – 50 % EPS, 30 % PP – 70 % EPS, and 10 % PP – 90 % EPS**, the materials were mixed in an internal mixer at a temperature of 190º C in order to obtain a homogeneous mixture through molding press.

Results

The 10 % EPS – 90 % PP mixture demonstrated its ductile nature, indicating that the greater the amount of EPS in the mixture, the more fragile the material tends to be.





Conclusions

The maximum values obtained that represent the best material behavior in the stress-strain test correspond to the mixture with the highest content of **PP (10 % EPS – 90 % PP).** However, the curve analysis and the histogram of the standard deviation of the maximum force show that mixtures with an average EPS content of **30 % - 90 %** are of interest to further develop the physical, mechanical and chemical characterization.

References

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