

Bio-Composite: Use of Lignin and Thermal Polyolefins to Create More Sustainable Products in the Automotive Industry

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Thermal polyolefins(TPO) is a plastic often made from rubber and filler material used in the automotive industry because of its durability, weather resistance, and flexibility. Although, there is a significant issue with the material and that is its lack of biodegradability and its inability to flame retardant.

These issues combined have led for much to be desired in TPO parts as a whole. These issues can however be addressed through the use of bioproduct call lignin. Lignin posses the biodegradability and flame retardance that TPO'S need to become more effective in the automotive industry and industries beyond.

THE PROBLEM

Though TPO has great qualities it is not very sustainable. Also though it has a high flame resistance lignin can further increase its flame retardance.



EXPERIMENTAL SECTION

My approach was to gradually add the lignin powder into melted TPO to form a more cohesive composite.



The melting of the TPO

RESULTS



The composite maintained both of the qualities of lignin and TPO creating a more sustainable automotive material.

THE SOLUTION

- **Solution:** lignin composite material
- **Pros:** Biodegradability, enhanced flame resistance and retardance
- **Cons:** mass production methods have yet to be developed

RESEARCH PLAN

My research plan involved doing the following:

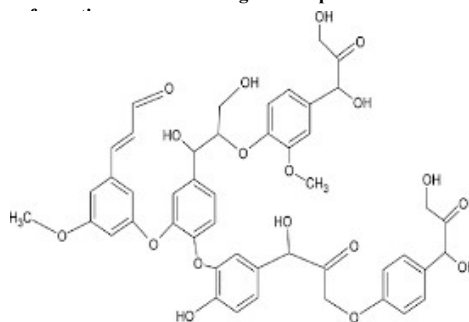
- Gathering information on TPO
- Gathering information on Lignin TPO composites
- Investigate the sustainability of this new composite
- Conduct an experiment and determine the viability of the composite.



The materials used during the composite

FUTURE WORK

The next step in this project is to make a more efficient method to form this composite.



The chemical structure of lignin

Conclusion: Based on the results of my experiment, the lignin based polyurethane burned slower. If used in the electric vehicles, it will be a good material for responding to fires and combustive situations with electric vehicles.