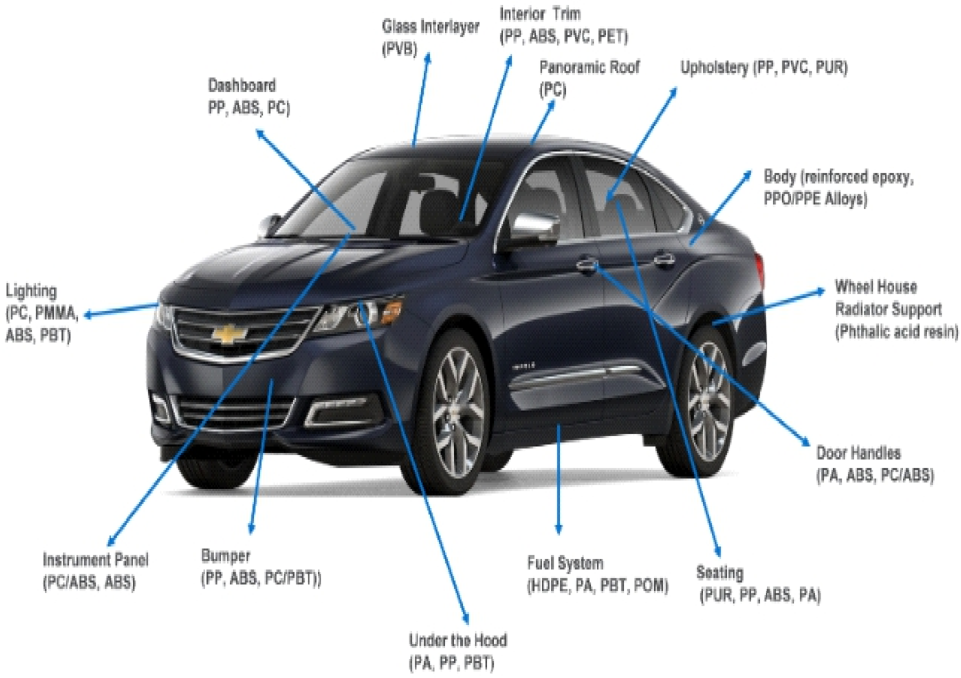
Green Polypropylene Composites as Next-Gen Engineering Plastics in Automobiles, furniture and Toys

Mangalore Refinery and Petrochemicals Limited (MRPL) and Central Institute of Petrochemicals Engineering and Technology (CIPET)

Introduction

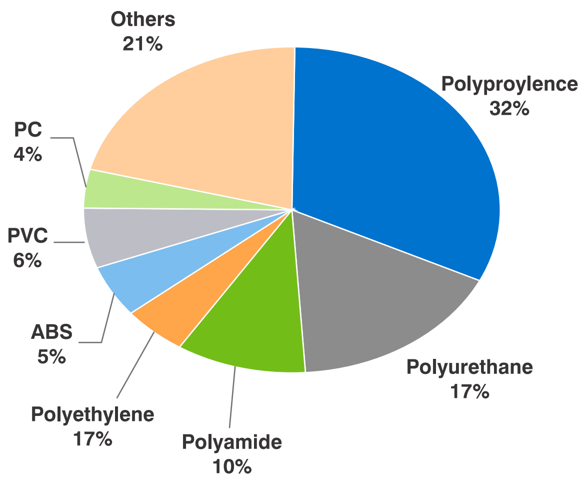
Focus on the development of high-performance green-materials & manufacturing technologies by:

- Incorporating renewable materials
- Reducing energy input & fuel consumption
- Satisfying strict performance criteria enriches further both initiatives in terms of:
  - Green-material design
  - Scientific output (micro/nano-sized indigenous fibers, carbon fibers)
  - Foundation for a green-economy: job creation/new business models



Nearly 15-17% of an automobile's weight comprises components made of Engineering plastics like Acrylonitrile Butadiene Styrene (ABS) etc., owing to its excellent impact strength and surface finish. To provide a sustainable alternative, MRPL initiated the development of Green Polypropylene composites by incorporating natural fibers into polypropylene, aiming to achieve properties comparable to ABS

440KTPA PP production facility at MRPL



MRPL Approach

- Design and Engineering of Lightweight and Sustainable Hybrid Green Composite Autoparts.
- Development of Dimensionally and Thermally Stable Green-Composites
- Fundamentals of Interphase, Functional Components and Surface Engineering

Polypropylene + Natural Fiber / Cross Linker / Impact Modifier / Flame Retardant = Green Polypropylence Composites

Auto components: Door panels and bonnet accessory

Certifications

GI NATURAL FIBRE COMPOSITES Pvt. Ltd.

1/2C/1R, Ramkrishna Naskar Lane, Kolkata - 700 010, India
Telefax : (033) 2373-1166, E-mail : gikolkata2000@gmail.com
MANUFACTURER OF : BRUSH, FRP, NFTC AND JUTE - BAMBOO COMPOSITE PRODUCTS

Date : 30/04/2021.

TO WHOMSOEVER IT MAY CONCERN

This is with respect to the polypropylene based composites material developed by CIPET for automobile applications.

The PP-natural fiber composite material supplied by CIPET was taken up for trials for the production of one of the car interior consoles, i.e. Door Panel section.

The part was decided based on the technical datasheet of the material. The material has good mold ability and the part strength and its other properties are also at par with the materials used for Automobile Applications Material.

In this regard, we agree to take up the material for future production in consultation with the respective customer.

Sincerely

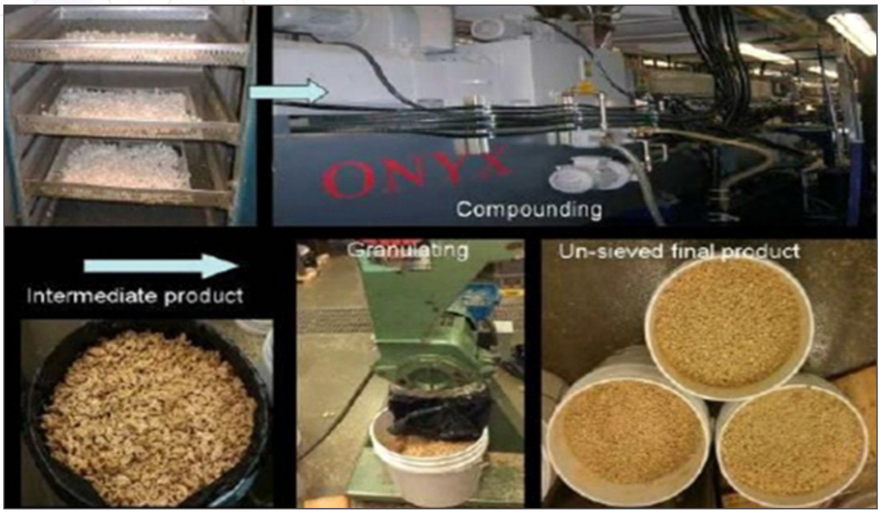
Avik Shee
Managing Director

Gi natural fibre Composites Pvt. Ltd. Kolkata-10 1/2C/1R, R. K. Naskar Lane

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

- MRPL, in collaboration with the Central Institute of Petrochemicals Engineering and Technology (CIPET), has been granted patents for the developed technology. The Technology has been tested and certified by A B Composites Pvt. Ltd., GI Natural Fibre composites Pvt. Ltd., Natur Tech India Pvt. Ltd.

Preparation of natural fiber composites



Analyses of the properties

1. Melt flow index (ASTM D 1238)
2. Density(ASTM D 792)
3. Mechanical property evaluation
   Tensile properties (ASTM D 638)
   Flexural properties (ASTM D 790)
   Impact properties (ASTM D 256)
4. Thermal characterization
   DSC (ASTM D 3418)
   TG(ASTM E 1131)
5. Flammability (UL 94) ASTM D 3801

Mechanical, Thermal and other Properties of the composites: Comparable to ABS and TPO

Conclusions:

- The current study provides the following benefits;
- Cost effective formulation with 20-25% loading of natural fibre with less Green house gas emissions
- Low loading of α olefin which in turn has added benefits of cost reduction
- Low density and high modulus of the material compared with the OEM range of formulations
- Cost effective green composite with a cost reduction of 20%, comparable wear and tear and increased efficiency owing light weight.

Way forward:

- Eco-friendly High performance PP Composites can be applied to following sectors:
- Toy Manufacturing Sector: Substitute for wooden products
- Decks/Benches
- Construction Industries: Wooden Doors