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Contribution ID: 28

Type: **not specified**

Study of biocomposite materials for automotive applications

Thursday, 23 May 2013 14:30 (30 minutes)

Polymer composites have been the dominant emerging materials over the past decades. The huge amount of composites applications have steadily enlarged and accordingly they are conquering new markets. Natural-fiber-reinforced composites are within a class of biocomposites that is arising as a viable alternative to the regular glass-fiber-reinforced composites, especially for automotive applications. Vegetable-fiber-based composites present interesting features such as low cost, low density which is crucial for light-weighting technologies and competitive mechanical behavior. Among many natural fibers, sisal is becoming a great filler for composites reinforcement. The goals of the present study are: to investigate the properties of a polypropylene biocomposite reinforced with 20% of sisal fibers, compare its characteristics with current glass-fiber-reinforced composites, and identify promising industrial applications. The material is being tested in terms of mechanical and thermal performances. The first results of flexural tests show that the sisal-based biocomposite presents higher ultimate tensile strength than the standard composites and comparable flexural modulus. The tensile testing revealed that the biocomposite supports a maximum load higher than the reference materials but its elongation percentage is lower resulting in a brittle behavior. Other important experimental analysis being employed at the moment are: heat deflection temperature, vicat softening point, izod impact strength, fogging and ageing tests. The properties obtained so far show a great usage probability to fabricate vehicle interior components due to its comparable profile to the materials being applied currently.

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Session Classification: Early Afternoon Session Thursday