Abstract of Presentation

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Presentation Title(Should be no more than 20 words):

Interfaces in composites based on wood and other lignocellulosic fiber

Abstract :

Composite materials based on wood or other forms of lignocellulosic fiber offer many opportunities for the development of new materials – for construction, transportation, consumer goods and a host of other application. In common with all composites, the interfaces (or interphases) created during the formation of wood and natural fiber-based composites largely control both the short and long term performance of these materials. This interface is, in turn, influenced by the physical and chemical properties of the substrate (fiber), the properties of the adhesive (matrix) and the interaction between the two in the formed system (micromechanics).

This presentation will focus on two key areas of current research interest: firstly the influence of raw material and process conditions on the surface properties of wood and how this subsequently affects the development of the adhesive bond and secondly, interfacial micromechanics in polymer matrix composites reinforced with wood and other natural fibers.

In the first case, certain processes such as hydrothermal pretreatment of the raw material at temperatures of less than 70 ^{o}C have been found to strongly influence both the short and long term surface properties of (birch) veneer. This in turn has been demonstrated to influence the development and strength of the adhesive bond. Understanding these processes is the subject of a forthcoming research project.

In the second case, the presence of naturally occurring features and process induced defects in wood and non wood fiber has been shown to strongly influence interfacial behavior, when these fibers are used to reinforce polymeric matrices. The exact nature of how the interface is affected by the fiber properties has not yet been fully elucidated nor how to alter this behavior through fiber and / or matrix modification. This issue is the subject of ongoing research to investigate the micromechanics of deformation and fracture in lignocellulosic fiber reinforced polymer matrix composites.

Recently completed and ongoing work in both these areas will be presented.