

## Ecologically Friendly Composites

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The composites containing dry wood materials—including wood + polymer composites (WPCs)—attract increasing attention of scientists and engineers. Low specific weight, high mechanical strength, stability in a variety of atmospheric environments, high durability and low cost are some of the advantageous properties of these composites (an incomplete list). Advantageous from the point of view of environment preservation is the use of renewable raw materials (including leaves and needles), also combined with the natural waste materials such as sawdust.

So, obtaining of new wood polymer composites with improve properties on the basis of renewable raw materials is actual.

The objective of our work is the development of new composites with improved properties containing dispersed bamboo particles (with length less than 50  $\mu\text{m}$ ). The binders were: polyethylene, PhES-50, PhES-80, liquid glass (LG), colophony and wood glue

We have obtained composites on the basis of dry bamboo powders and in turn several binders, including polyethylene (PE) and alkoxy silanes. The composites were studied by Fourier transformation infrared spectroscopy (FTIR), optical and scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDS). Some mechanical properties were determined along with thermal stability by thermogravimetry and water absorption. FTIR results show formation of primary chemical bonds between bamboo surface active groups and the binders. Mechanical property improvement goes symbatically with the thermal stability.

Our composites based on bamboo and some organic-inorganic binders have generally advantageous properties for a variety of applications. Apparently chemical bonds are formed between bamboo surface active groups and binder molecules.

Bamboos include some of the fastest growing plants in the world. Certain species of bamboo can grow up approximately 90 cm in 24 hours. While bamboos have long been used as a food source, they also have extensive application as construction materials. The reinforcement provided by our binders can extend that application range. In the future one can consider using bamboo with our binders as a constituent in polymer concretes

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