

LABORATORY DESCRIPTION

General Information

School	Geotechnical Sciences
Department	Forest and Natural Environment Sciences

Title of the Laboratory - Acronym

Wood Chemistry-Technology and Biocomposites Laboratory (WOOO-BC-LAB)

Head of the Laboratory

Assoc. Professor Antonios N. Papadopoulos

Short Description

The fibrous nature of wood has made it one of the most appropriate and versatile raw material for various uses. However, two properties restrict its much wider use, namely, dimensional changes when subjected to fluctuating humidity, and susceptibility to biodegradation by micro-organisms. Wood may be modified chemically or thermally, so that selected properties are enhanced in a more or less permanent fashion. Another option to improve these properties is to exploit the solutions that nanotechnology can offer. In addition, the use of lignocellulosic materials for the production of advanced wood composites is an innovative avenue for research. The Laboratory therefore, focuses on the latest approaches to the protection of wood and wood composites with chemical, thermal or enzymatic modification technologies, the application of carbon fiber fabrics and the use of various innovative lignocellulosic materials for the production of advanced wood composites. The last two years, the laboratory focuses on the latest approaches on the development and applications of nanomaterials to both solid wood and wood products to enhance their properties. Employing nanotechnology on wood can result in a next generation of products having hyper-performance and superior service ability when used in severe environments, since it is well known that the cell wall of wood exhibits porosity of molecular scale dimensions due to the partial filling of space between the cellulose microfibrils by lignin, hemicelluloses and extractives. The small size nanoparticles of such nanotechnology compounds can deeply penetrate into the wood, effectively alter its surface chemistry, and result in a high protection against moisture and decay.