

Improvement of selected properties of Wood-Polymer Composites (WPC) - Silane modification of wood particles



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IMPROVEMENT OF SELECTED PROPERTIES OF WOOD-POLYMER COMPOSITES (WPC) - SILANE MODIFICATION OF WOOD PARTICLES



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Cuvillier Verlag Nov 2010, 2010. Taschenbuch. Condition: Neu. Neuware - Wood Polymer Composites are a new group of hybrid materials, which combine the advantages of synthetic polymers such as polyolefines and natural polymers such as wood; whereas the synthetic polymer is used as matrix material and the wood as reinforcement material or filler. As matrix material, principally every thermoplastic polymer with a processing temperature below 200°C can be used due to the temperature sensitivity of wood. Wood Polymer Composites are processed typically with processing technologies from the plastic industry such as extrusion and injection molding. The present study was conducted to explore the possibility of wood particle modification with different types of silanes. It was the aim to contribute the silanes as compatibilizers or coupling agent and therefore improve the mechanical properties and the resistance against water. Norway spruce (*Picea abies*) as representative wood species was used in three different particle types. The size distribution for the wood particles ranges from 70-2500 µm. Four commercial available silanes with various functional groups (amino, di-amino, alkyl) were used as modification agents. The concentrations varied between 1.5%, 3.0%, 4.5% and 7.5%. As reference system commonly used maleated acid anhydride based coupling agents were used. The pre-treated wood particles were compounded via extrusion with polypropylene and samples were produced via injection and compression molding. The following properties were tested; tensile, bending, and impact strength, water uptake (cold and boiling water test), descent rate, weathering tests and durability test against basidiomycetes. SEM-EDX investigations proved the presence of silane either in the cell wall structure, or on the wood particle surface. Due to the structure and the functionality of the silanes it was expected that the silane treated wood particles are able to improve the mechanical properties. It was shown that the silanes had no significant effect as compatibilizer or coupling agent. The mechanical properties strongly increase with the usage of coupling agent. Both coupling agents were based on maleic...

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