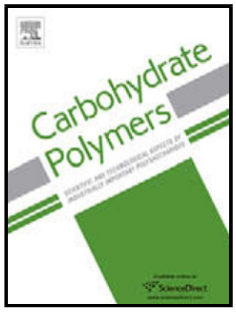


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# Improving the thermal stability of wood-based cellulose by esterification

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HIGHLIGHTS

- Esterification improved the thermal stability of wood pulp and nanofibers.
- Benzoyl and pivaloyl esters gave higher thermal stability than straight-chain esters.
- The degree of substitution affects the thermal stability of esterified wood pulps.
- Complete esterification of hemicellulose significantly improves thermal stability.
- Benzoylation increases the temperature at the onset of degradation of nanofibers.

**ABSTRACT**

Improvement in the thermal stability of wood-based cellulose; the needle-leaf, bleached, krafp pulp (NBKP) and the wood cellulose nanofibers (WCNF) obtained from the NBKP, was achieved by esterification. Initially, four different types of NBKP esters (acetyl, C2; myristoyl, C14; benzoyl, BNZ; and pivaloyl, PIV) with different degree of substitution (DS) values were prepared to evaluate the effect of esterifying the hemicellulose. The findings revealed that an optimum DS, which possibly completely esterifies the hemicellulose and amorphous cellulose, is needed to achieve significant improvement in thermal stability. Moreover, BNZ and PIV gave higher thermal stability than that of the C2 and C14.