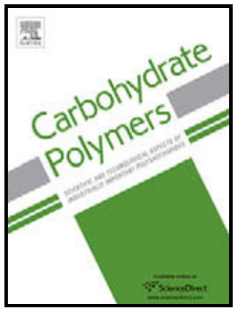

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Investigation of OH bond energy for chemically treated alfa fibers

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Highlights:

- This work focuses on the structure analysis of treated alfa fiber using FTIR-ATR spectroscopy.
- An in-depth study of the changes on hydrogen bond energy of treated alfa fibers was conducted.
- The region of interest was the OH bond ranging from 2800 to 3800 cm^{-1}.
- Inter and intramolecular hydrogen bonds and free OH groups were fully analyzed.

Abstract

This work aims to study the hydrogen bond energy and distance for different samples of alfa fibers treated with thymol. The treatment duration and thymol concentration were varied and seem to have a great influence on infrared band intensities and positions. The number of hydrogen bonds is related to the infrared band intensity, whereas their energy and distance depend on the infrared band position.

It was proven that the free hydroxyl groups are weakened and tend to disappear with fiber treatment. It is the same for intermolecular hydrogen bands between cellulosic chains that present a decrease in both intensity and frequency.

The two intramolecular hydrogen bands increase in intensity but exhibit different behaviors regarding the calculated energy: while the band at 3268 cm^{-1} is weakened and shifted to higher wavenumbers, that at 3338 cm^{-1} keeps the same peak position and energy.

Chemical compounds studied in this article: