عنوان مقاله:

Application of ATR Infrared Spectroscopy in Wood Acetylation

محل انتشار:

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خلاصه مقاله:

Acetylation is a chemical modification of wood to enhance its properties. IR-spectroscopy is a useful technique for proofing chemical bondings in wood and the At-tenuated Total Reflection (ATR) Infrared Spectroscopy technique was applied as an eas-ier technique over other IR-spectroscopies. In this research, different degrees of acetyla-tion, weight percentage gains (WPGs) in beech and pine mini-stakes were achieved by us-ing acetic anhydride. Acetylated samples were analyzed by applying an Attenuated Total Reflection (ATR) Infrared Spectroscopy technique. Comparison of the acetylated samples with non-acetylated woods showed that hydroxyl groups (O-H) were diminished at wave numbers of about ۳,۳۵۴-۳,۳۲۸ cm-۱ due to the substitution of hydrophobic acetyl groups in cell wall polymers. A strong peak appeared at wave numbers of about ۱,۷۳۳-۱,۷۲۸ cm-۱ in beech and ۱,۷۳۷-۱,۷۲۸ cm-۱ in pine due to the carbonyl (C=O) stretching of acetyl groups. The magnitude of the bands increased with raising the weight percentage gains (WPGs). The methyl deformation of the acetyl groups induced at wave number ۱۳۶۹ cm-۱ caused by the stretching of C-H in polysaccharides. There was also a clear increase in the magni-tude of the wave numbers at about ۱۲۳۴-۱۲۲۶ cm-۱ in beech and ۱۲۳۶-۱۲۲۶ cm-۱ in pine due to the stretching of C-O and carbonyl deformation in the ester bonds during the ace-tylation of lignin.

کلمات کلیدی:

Acetylation, Acetyl groups, Attenuated total reflection, Infrared Spectroscopy, Beech, IR spectroscopy