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warty birch (*Betula pendula*). In one study, its cortex was used to measure the concentration of heavy metals.

The bark of trees can be used as an accumulating bioindicator due to the presence throughout the life of the tree, it enables the accumulation of pollutants with its entire surface. Moreover, it is a tissue in which no metabolism or excretion of products takes place [5]. Scots pine (*Pinus sylvestris*) is also a bioindicator.

The study with the use of pine needles confirmed its usefulness for monitoring the profile of air pollution with organochlorine compounds [6]. Scots pine is also a species sensitive to fluoride contamination.

Other plant species sensitive to fluoride contamination are: barberry (*Berberis vulgaris*), St. John's wort (*Hypericum perforatum*), lily of the valley (*Maianthemum bifolium*), mountain pine (*Pinus mugo*), gladioli (*Gladiolus sp*.) [7].

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FABRICANT OF HIGHLY TRANSPARENT WOOD BIOCOMPOSITE FROM BALSA WOOD BY UV SUPPORTING

Introduction

Transparent wood is an extremely desirable building material because of its advantages in terms of high optical transmittance, good mechanical qualities, and effective thermal insulation. However, because thick or large-size transparent wood is practically unattainable, the current research is restricted to producing small-size samples in the lab. For practical purposes, a technology that can easily and quickly make transparent wood of any dimension and thickness is required. High light transmittance is achieved by using transparent wood manufactured from wood fibers as a substrate because it allows the cell walls to adhere to the impregnated polymer more firmly. The transparent wood produced by this method, as compared to wood produced using previously described methods, not only has the same benefits but also has a better preparation efficiency and is appropriate for commercial production.

The current approach for preparation of transparent wood [1] is based on delignification of the substrate followed by the polymer infiltration with matching refractive index to the wood substrate. Since lignin is responsible for 80-95% of the light absorption in wood, delignification is essential in the studies that have been reported [2]. To eliminate colored substances, including lignin, wood can be treated for 1-2 days with a 5% aqueous solution of sodium hypochlorite. Although lignin only makes up about 30 weight percent of wood, it builds cross-links with other polysaccharides in wood to provide structural stability [3]. The removal of lignin will damage the structure of the wood, making it difficult and impossible to handle and fabricate large substrates. This limits the variety of wood species that can be used to prepare transparent wood.

Research Objects

The idea of producing transparent wood without delignification was examined in light of the above-mentioned barriers. Large transparent wood preparation with independence from the species of wood may be possible through lignin modification by eliminating just chromophoric groups. Since alkaline H_2O_2 treatment is known to reduce wood's light absorption and has a low delignificationn. While the majority of the lignin is retained, chromophore structures are either eliminated during the process. As a result, the wood structure's hierarchical structure is better protected. In this instance, the reagent H_2O_2 was utilized to keep the primary structural elements of the wood while only removing the chromophores.

In this method, balsa wood with the thickness of 1 mm was exposed to alkaline H_2O_2 treatment with UV supporting. The lignin treatment samples were impregnated with epoxy in vaccum. The time is applied for lignin treatment in the range of 1-5 hours. After 1 hour, the brightness of natural wood begin to brighter. However, further increase in the processing time of 5 hours did not increase the brightness beyond 80% (Fig. 1)

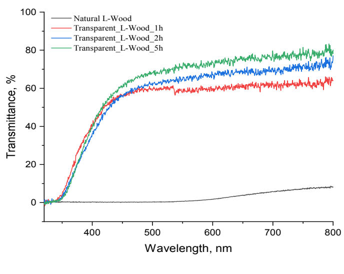

Fig. 1 The transmittance of natural and transparent woo

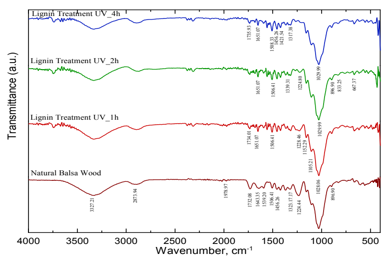

Fig. 2 The FTIR of natural balsa and modified wood