
ABSTRACTS (MASTER THESIS)

**Clarification of NO₂ sorption behavior and
Assessment of air quality in warehouse of cedar timber**

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Introduction

In recent years Japanese cedar (*Cryptomeria japonica*) wood showed high NO₂ sorption ability compared with other wood species. The cross-sectional surface of tracheid, the extractives and the moisture of wood were the factors affecting the sorption performance of NO₂. However, the influences of these factors are not evaluated in detail. Japanese cedar timber also showed high humidity control function in end grain. As a material the flat-sawn Japanese cedar timber slitted across the end grain is developer. However, there were few evaluation studies in actual space. This research discusses the characterization of the NO₂ sorption behavior with various sample configurations and drying methods and the humidity-control function of Japanese cedar.

Methods

[1]NO₂ sorption behavior: In an incubator at 20°C, samples of Japanese cedar with various configurations and drying method were aerated with an air under the NO₂ concentration of 1000ppb (low velocity: 560ml/min). NO₂ concentration before and after passing through the samples was monitored with a NO_x analyzer for 24hrs. The amount of NO₂ sorption was calculated and compared among various samples.

[2]Humidity control function: In indoor warehouse cedar slitted panels were set, and the change of temperature and relative humidity, aldehyde concentration and metal corrosion were measured for a year.

Results and discussion

[1] Fig.1 shows the amount of NO₂ sorption of 1.5mm-thick discoidal and 15mm-thick plated specimens of cross-section where the gas flows through/over the tracheid, respectively. The former absorbed the NO₂ much more than the latter. This indicated that the effect of NO₂ sorption depends on available inner surface area of contact. NO₂ sorption ratio of the specimens decreased with the increase of drying temperature due to the amount of extractives in the specimen, thus the amount of NO₂ sorption is affected by the extractives of the specimens.

[2] The relationship between the amount of cedar slitted panels and humidity change ratio in air volume at indoor warehouse described a high correlation. It means that the cedar slitted panels have a high humidity control function in actual space.

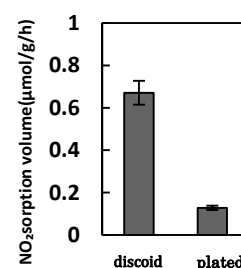


Fig1. NO₂ sorption volume of different gas contact condition