Study on Fixation of Wood Preservatives to Wood by Measurement of Electrokinetic Potential.

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In wood preservatives, the reactivity with wood, absorption at wood surface, and the penetrability through wood cell membrane are of great importance. All of these properties may mainly be considered as the results of the ionization of the treated solution and of the reactions based on the electrokinetic phenomena. Especially, the reactions of the penetration and fixation phenomena. Especially, the reactions of the penetration and fixation of chemicals proceed on the interface between chemicals and wood. This study was undertaken in order to apply the method of streaming potential in the field of wood preservation. It is conceivable that streaming potential of wood is related to changes in wood composition and fixation or adsorption of wood preservatives. We attempted to develop a method for estimating the streaming potential of wood. Also, the streaming potential in the wood decayed by wood-destroying fungi and the wood treated with various wood preservatives was measured by using SHIMADZU ZP 10 B type; $\xi$-potential was calculated by the equation of Helmholtz-Smoluchowski.

We investigated i) $\xi$-potential influenced by species of wood, wood Flour sizes, wood extractives and hydration ii) Electrokinetic phenomena on wood surface decayed by *Coriolus palustris* and *Coriolus versicolor* and critical functional groups affecting the $\xi$-potential iii) Relationship between the $\xi$-potential of wood treated with various Copper-Chromium Arsenic (CCA) or quaternary ammonium salt type wood preservatives and the fixation or adsorption reaction.

The results obtained were as follows:

1. $\xi$-potential of wood varied with wood species, indicating -6.6~6.9mV in hardwoods and -5.7~6.1mV in softwoods, $\xi$-potential of wood flour increased as the wood flour size becomes smaller, and wood flour of 150 mesh or smaller showed more stable values. It would be considered that when wood flour was immersed in water for a long time, the $\xi$-potential of wood flour was stable. It was shown that the values of $\xi$-potential became stabler when extracted with alcohol-benzene.

2. $\xi$-potential of wood decayed by *Coriolus palustris* and *C. solus versicolor* varied with wood species or fungus species. It was shown that degradation of wood by decaying fungi can be detected by measuring of the $\xi$-potential, and it was affected by carboxyl groups produced by degradation of wood composition.

3. It was shown that the woods treated with various type preservatives had a lower or higher value in $\xi$-potential than that of untreated wood. There were remarkable changes in $\xi$-potential values with the fixation periods or absorption time of preservatives in wood and the elapsed time in measuring, which showed a fixated or adsorbed condition of preservative components to wood. We could obtain the fixated or adsorbed amount of active ingredients to wood by density of surface electric change based on $\xi$-potential. It was shown that the fixated or adsorbed amount of preservatives to wood increased linearly as concentration of treating solution increased, which indicated quantitative reactions in fixation or adsorption of preservatives.