

## セルロースナノファイバーと紫外線吸収剤を利用した木材用水性塗料の開発と評価

(佐賀県工技セ<sup>1</sup>) ○久間俊平<sup>1</sup>・田栗有樹<sup>1</sup>・帆秋圭司<sup>1</sup>・矢野昌之<sup>1</sup>

Development and evaluation of water-based paint for wood using cellulose nano fiber and ultraviolet absorber (<sup>1</sup>*Industrial Technology Center of Saga*) ○Shunpei Kuma<sup>1</sup>, Yuki Taguri<sup>1</sup>, Keiji Hoaki<sup>1</sup>, Masayuki Yano<sup>1</sup>

There are increasing needs for wood paints that have a low environmental impact as well as woody feel and high weather resistance. However, transparent water-based paints that do not impair the woody feel and have a low environmental impact have a problem with weather resistance. In this study, water-based paints were developed with silicone, which has good weather resistance, as the main component and biomass-derived additives with low environmental impact were added. As additives, cellulose nano fiber (CNF), which is derived from bamboo and has high strength, high elasticity, and ferulic acid (figure1), which is manufactured from rice bran and has UV absorption ability and antioxidant properties, were added. In practice, a paint mixture of silicone emulsion and CNF was applied to quartz glass. As a result, transmittance was reduced due to light scattering. The addition of ferulic acid further reduced the transmittance due to absorption of ultraviolet rays (figure2). Next, after the aqueous paints were applied to the wood, the wood was irradiated with ultraviolet light. The results of the evaluation of the color change over time, painted wood's changes were suppressed.

**Keywords :** cellulose nano fiber; ultraviolet absorber; water-based paint

木材用塗料について、木質感や高耐候性等の性能と共に低環境負荷であることが求められている。しかし、木質感を損なわず低環境負荷である透明系水性塗料は、耐候性に課題がある。本研究では、耐候性に優れるシリコーンを主成分とし、低環境負荷のバイオマス由来添加剤を加えた水性クリア塗料を開発した。添加剤として、竹由来で、高強度・高弾性の性能を有するセルロースナノファイバー (CNF) 及び米ぬかより製造可能で、紫外線吸収能や酸化防止機能を有するフェルラ酸 (図1) 等を添加した。

実際に、シリコーンエマルジョンと CNF を混合した塗料を石英ガラスに塗布した。その結果、光散乱により透過率は低下した。また、さらにフェルラ酸を添加することで紫外線が吸収され、より透過率は低下した (図2)。次に、それらの水性塗料を木材に塗布した後、紫外線を照射した。色の経時変化を評価した結果、塗装木材の変色を抑制することができた。

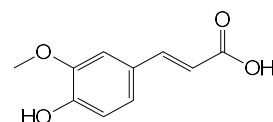


図1 フェルラ酸の構造式

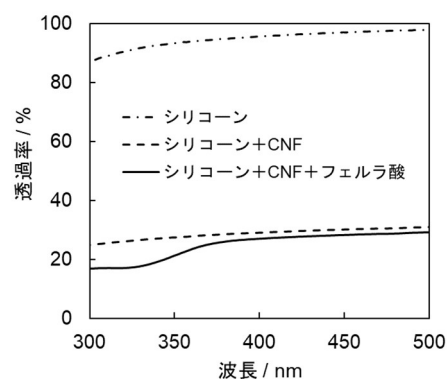


図2 塗膜の透過率