

修護用樹脂保護漆添加光安定劑 之加速老化實驗研究

The Studies of Light Stabilizers Applied
on Resin Coatings Used in Conservation
under Accelerated Weathering Test

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摘 要

樹脂保護漆暴露在自然環境中，很容易受到陽光中紫外線輻射的影響而產生變色或劣化，爲了提高樹脂保護漆的耐久性質，添加光安定劑以阻止紫外線對塗膜所造成的破壞，是常見的作法。本次實驗選用了兩種不同類型的光安定劑：紫外線吸收劑（Benzotriazole，BTA）與受阻胺光安定劑（Hindered Amine Light Stabilizer，HALS），以單獨或混合的方式添加於三種目前已用於文物修護的樹脂保護漆：脲醛樹脂（Laropal®A81）、氰化碳氫化合物樹脂（Regalrez®1126）與壓克力合成樹脂（Paraloid®B-48N），再將樹脂塗料塗佈於試片上進行人工加速老化實驗，之後分析比較各項老化前後的塗膜性質，以了解添加光安定劑是否對於這些樹脂的耐久性有所助益。

實驗結果顯示，光安定劑是否能有效抑制塗膜劣化的發生，會隨著塗料的種類而有所不同。於 Laropal®A81 中添加 HALS 型光安定劑的耐久性改善效果比添加 BTA 型光安定劑還明顯；同時添加 BTA 與 HALS 雖然比單一添加的效果還好，但仍然無法有效改善 Laropal®A81 的劣化。Regalrez®1126 添加 HALS 型光安定劑減緩塗膜劣化的效果，比添加 BTA 型光安定劑的效果還好；若同時添加 BTA 與 HALS 型光安定劑，則對於 Regalrez®1126 的劣化改善效果最好。由於 Paraloid®B-48N 本身具有良好的耐久性，因此添加光安定劑的減緩劣化效果均不明顯。

關鍵詞：光安定劑、樹脂保護漆、木質修護、耐候性

Abstract

Resin coating is susceptible to discoloration and degradation in natural environment due to ultraviolet radiation. In order to enhance weatherability of the coating, it is common to add light stabilizers to prevent damage caused by ultraviolet light from the sun. This study selected two types of light stabilizers, UV absorbers (Benzotriazole, BTA) and hindered amine light stabilizers (HALS). They were added to three types of resin coatings in different formulations. The resin coatings used are the ones commonly in use for wood conservation. They are urea-aldehyde resin (Laropal®A81), hydrogenated hydrocarbon resin (Regalrez®1126) and acrylic resin (Paraloid®B-48N). The resin coatings were put through the QUV accelerated weathering test, and variations in the properties of the coatings were measured.

The results of experiments show that effectiveness of light stabilizers on the weatherability improvement depends on the kinds of coatings. In Laropal®A81 and Regalrez®1126, adding both BTA and HALS to the resin coating improves weatherability most significantly, followed by adding only HALS, and lastly by adding BTA. Light stabilizers did not exhibit significant improvement in Paraloid®B-48N. This coating exhibits excellent light stability in the experiment, and kept intact after the accelerating aging process (600hrs). The addition of light stabilizers impeded degradation, however the results are limited.

Keywords: Light stabilizer, Resin coating, Wood conservation, Weatherability