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論文 名稱 (英)	A Study on the Color and Other Properties of the Co60 γ -ray Irradiation Aged Silk Mending Materials
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摘要(中)	<p>我國為歷史悠久之文化古國，流傳相當豐富的書畫文物資產於世。在歷經世代的交替傳承後，對書畫文物難免產生些許的毀損，需藉由專業修復和識與技術以防止書畫文物受損狀況繼續惡化，並儘可能恢復其原貌與藝術價值。然而，合適的修補材料之選擇，除了在纖維種類與組織結構上應與原文物近似外，亦著重在質感、光澤與顏色等方面的要求。是故新的材料必須過度的老化，方能適用為書畫文物之修補材料。本論文為一探索性之研究，將修復專家所著重之考量要素與標準，利用客觀之科學試驗方法予以分析和量化，以期能更有利於修補材料之研發、製造和品質改良。為使研究之理論和修補材料之實務能相互結合，</p>

選擇使用日製岩野繪絹為實驗材料，並應用五種不同的鈷 60 γ 射線照射劑量，使岩野繪絹經照射後形成不同的老化程度後，就顏色及其他特性（表面觀察、彎曲試驗、皺折恢復性試驗、電子順磁共振、光譜分析、主觀手感評估）加以評估之；並探討鈷 60 γ 射線照射技術，實際應用於製作老化蠶絲修補材料之可行性。同時，經由本論文所設定「置放時間」置放後，再進行顏色測量與其他特性試驗，以進一步了解「置放時間」對照射過後的蠶絲布樣所造成之影響。其中，顏色測量可以分析 60 γ 射線照射劑量高低所造成之佈樣樣本顏色變化，甚至是主觀手感評估中，以肉眼在同一光源下所不易觀察到之顏色變化程度。利用掃描式電子顯微鏡可以對所有樣本之表面進行觀察，可識別岩野繪絹表面之不同老化程度；亦可以彌補主觀手感評估中，無法以肉眼觀察到鈷 60 γ 射線照射造成樣本表面之細微的變化現象。電子順共振光譜儀亦可以對所有樣本進行電子自旋數分析，其分析結果可以配合主觀手感評估結果，明確的顯示樣本之老化程度，並進一步確認人工老化修補材之穩定性。將顏色測量、掃描式電子顯微鏡觀察及電子順磁共振光譜分析等三種方式之測試結果整合在一起後，可與本研究中之主觀手感評估結果相互結合，進行中國古書畫修補材料之研發工作。

摘要
(英)

China has a long cultural history and an extensive heritage of valuable Chinese silk paintings. Over a long period of time, having passed from generation to generation, many paintings have suffered considerable damage. There is need for more professional conservation knowledge and technology to prevent them from further deterioration, and to restore their original appearance and artistic value as much as possible. Suitable mending material should not only be composed of similar fiber type and fabric construction as the original painting, but also should approximate the original fabric in terms of texture, luster and color. Therefore, completely new materials are unsuitable for mending purposes unless they first have been subjected to an aging process. This exploratory study, tries to analyze and quantify the elements and standards that mending experts require for their work, by using objective scientific evaluation methods in order to facilitate and improve the development and manufacture of suitable mending materials. To combine theory with practicality, a special Japanese silk painting textile was chosen (岩野繪絹) as the research mending material and five different dosages of Co60 γ -ray irradiation were applied to obtain different levels of aging. Color change and other property changes of the five artificially aged silk mending materials were tested and assessed including surface conditions, bending ability, wrinkle recovery, electron spins frequency and subjective hand of the test fabric. Simultaneously, the result of this study also reaffirms the possibility of applying Co60 γ -ray irradiation to produce artificial aged silk mending materials. At the same time, the influence of different timing intervals was also examined. By means of the Spectrophotometer, small color changes among all of the samples could be measured which were not discernable by naked eye under the specified light source. By using Scanning Electron Microscopy, changes of surface condition at various aging levels of each sample could be observed. Employment of the Electron Paramagnetic Resonance Spectrometer (EPR) could

	measure the frequency of electrin spins of all samples revealing the nature of different levels of aging. Furthermore, the EPR results also could verify the stability of the aged mending materials over time. Simultaneous use of the above three objective evaluation methods plus the subjective hand evaluation in this study, and the results obtained will have an impact in the development of aged mending materials for historcal Chinese silk paintings and hopefully lead to further progress in related research and its practical application.
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