

國立臺灣博物館鑲嵌玻璃的材質檢測

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國立臺灣博物館(簡稱臺博館)創於西元1908年的日治時期，是臺灣最早創立的公立博物館，其前身為「臺灣總督府民政部殖產局附屬博物館」，主體建築物於1915年落成。此座建築具仿中古歐式的希臘式立柱式外觀，大廳中央圓頂則為鑲嵌彩色玻璃天窗。超過百年歷史的臺博館建築，至今曾經歷過數次的修繕，分別是西元1961年、1994年及2004年間的三次大修和數次小修；但大廳圓頂的鑲嵌彩色玻璃構件，則在2004年全面性進行修繕和復舊工作。

本研究材料為 2004 年修繕所換補的鑲嵌彩色玻璃樣本，使用 X 光螢光分析儀檢測玻璃的組成化學成分，用以討論鑲嵌玻璃所含元素種類與其繽紛色彩的關係，以為未來研究、保存及維護臺灣鑲嵌彩色玻璃的參考。

檢測結果顯示，臺博館的鑲嵌彩色玻璃屬於鈉鈣矽酸鹽玻璃，主要由 SiO_2 、 Na_2O 、 CaO 等三種氧化物組成。不同顏色玻璃亦檢測出不等量的 F、Mg、Al、Cl、K、Zn、Mn、Ba、As、Cu、Cr、Ti、Cd 等元素，可能為原料中之雜質或製造過程中的添加物。其中 Cu、Cr、Ti、Cd、Mn 可能是使臺博館鑲嵌玻璃產生不同色彩的主要化學成分。

本研究亦將鑲嵌玻璃進行可見光光譜及拉曼光譜量測，及探討其與化學成分之關係。

Material Identification of Stained Glass in National Taiwan Museum

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The oldest national museum in Taiwan, the National Taiwan Museum (NTM) was first founded in 1908 during the period of Japanese colonization as the “Bureau of Productive Industries’ Affiliated Museum under the Government-General of Taiwan”. The construction of the current main building was completed back in 1915. In addition to its much-admired Greek-style façade supported by regal Corinthian columns, the NTM building houses in the center of its lobby a colorful stained glass domed rotunda that has won kudos from visitors. Established for nearly one century, the NTM building has undergone three major renovations (1961, 1994, and 2004) and several minor ones. Its alluring stained glass ceiling, however, did not go through any comprehensive repair or restoration until 2004.

After securing fragments of the replacing and replaced stained glass during the 2004 restoration, we examined the chemical compositions of the glass materials with X-ray fluorescence. By identifying the types and amounts of the various elements in the stained glass and studying the chemical compositions of the glass fragments, we will discuss the possible relation between the chemical compositions of the glass and its fascinating colors. The results will hopefully serve as a useful reference for future research, preservation, and maintenance of stained glass artifacts in Taiwan.

Results of examination indicate that the NTM stained glass is mainly composed of SiO₂, Na₂O, and CaO, all oxidants commonly found in sodium-calcium silicate glass. Found in the glass fragments of different colors are various amounts of F, Mg, Al, Cl, K, Zn, Mn, Ba, As, Cu, Cr, Ti, and Cd, which may have come from impurities in the starting materials or additives used during the glass manufacturing process. Among those elements, Cu, Cr, Ti, Cd, and Mn are identified to be possible elements contributing to the generation of different colors in the NTM stained glass.

The visible light spectrum and Raman spectrum of the stained glass have both been acquired. We will discuss the result and its relation with the glass chemical composition.