文物修護科技案例研究

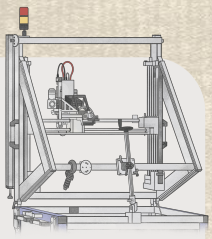
Conservation Science and Technology - Case Study

居巢（1811 – 1865）
草蟲花鳥扇面冊（頁九）
1847 – 1864
香港藝術館至樂樓藏品

Ju Chao (1811 – 1865)
Birds, insects and flowers (Leaf 9)
1847 – 1864
Chih Lo Lou Collection,
Hong Kong Museum of Art

綜合分析結果推斷作品用上：硃砂、鉛白、藍銅礦、藤黃及花青。

Combining the results would suggest these pigments were used in the artwork: cinnabar, lead white, azurite, gamboge and indigo.

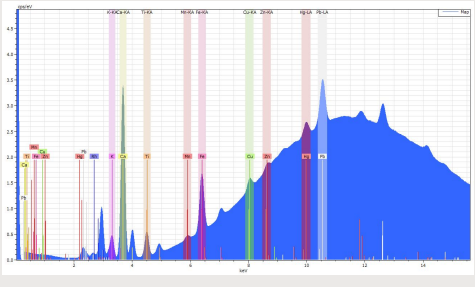


X射線螢光成像儀 MA-XRF

X射線螢光技術（XRF）是以X光掃瞄物質元素組成的技術。透過分析能譜圖，能夠準確檢測出此作品材料含有的元素。

X-ray fluorescence (XRF) is a technique that utilises X-rays to scan and identify the elemental composition of an object. By analysing the energy spectrum diagram, it is possible to accurately determine the elemental composition of an artwork.

XRF 能譜圖 Energy Spectrum

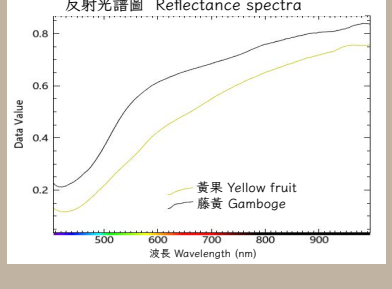


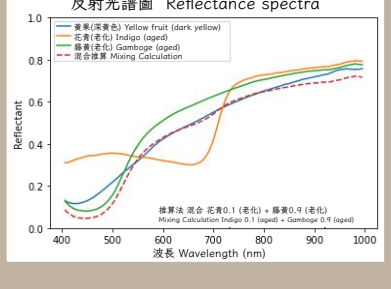
XRF 元素分佈圖 Elemental Map

銅 Copper　水銀(汞) Mercury
鉛 Lead

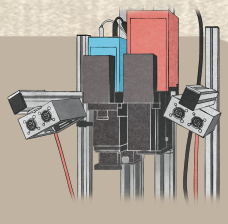
根據顏料位置與其元素信號分佈，便可推斷：紅花及印章用上硃砂（水銀）、果實用上鉛白（鉛）、而葉子和莖則用上藍銅礦（銅）。

Interpreting the painted areas with their corresponding elemental signal from the mapped result, it is possible to deduce: cinnabar (mercury) was used for the red flower and seal, lead white (lead) for the fruits, azurite (copper) for the leaves and stem.





黃色 藤黃 Gamboge
綠色 藤黃 + 花青
Gamboge + Indigo



高光譜成像　HSI

高光譜成像技術（HSI）以可見光及短波紅外線（涵蓋波長400至2500 納米）測量文物表面物料的光譜作分析及鑑別之用。利用已知材料的反射光譜，或以算法推算顏色的混合光譜，製成光譜角製圖，分析結果顯示作品很大機會使用了藤黃和花青作色。

Hyperspectral imaging (HSI) captures the reflectance spectrum of surface materials when irradiated with visible and short-wave infrared light (covering 400–2500 nanometers). Making use of known reference spectra or algorithms, spectral mixtures of colours can be calculated and a spectral angle mapping for analysis can be generated. The results indicate that this artwork likely consists of gamboge and indigo paint.