a 修復前
Before restoration

b 修復後
After restoration

C6.1　花樹鳥蒔絵螺鈿箪笥
Cabinet with Floral Design

a 修復後
Before restoration

b 修復後
After restoration

C6.2 花樹鳥蒔絵螺鈿箪笥 －背面部－
Cabinet with Floral Design, back

6. 花樹鳥蒔絵螺鈿箪笥

6. *Cabinet with Floral Design*

アシュモリアン博物館（英国）所蔵
The Ashmolean Museum Univercity of Oxford
(United Kingdom of Great Britain and Northern Ireland)

平成 21・22 年度修復事業
The 2009 and 2010 Japanese Fiscal Year

6.1. 修復報告

山下 好彦

6.1.1. 名称等

名称	花樹鳥蒔絵螺鈿箪笥一基
制作年代	桃山時代 16 世紀～ 17 世紀
所蔵者	アシュモリアン博物館（英国）
登録番号	EA1998.17

6.1.2. 工期及び施工者等

工期	平成 21 年 5 月～平成 23 年 3 月
施工場所	東京文化財研究所修復アトリエ（漆）
修復担当者	山下 好彦

6.1.3. 修復前の状態

損傷状態を下記に列記する。

- 箪笥全面に埃や汚れの付着が見られた。
- 素地接合箇所の各部に亀裂が認められた。
- 上段の引出し底板素地が中央で前後に割れていた。
- 箪笥の外面や内部のほぼ全面に西洋塗料が塗布されていた。
- 外面の西洋塗料下の漆塗膜は劣化が進行していた。
- 塗膜や螺鈿の剥離が著しく、天板窓枠内では広い面積に亘って剥離が認められた。
- 箪笥全面にわたり漆塗膜や螺鈿の剥落が認められ、下地が露出していた。
- 蒔絵や付描き線が一部で剥落し、下付け漆が露出していた。
- 箪笥の各所に打損や擦損があり、蒔絵や螺鈿の表面に損傷が認められた。引き出し底板は擦損によって木地が一部で露出していた。
- 絵梨地に使用された銀粉が銹化して変色していた。
- 後世修復時に西洋修復材料を用いて描かれた文様が各所に認められた。特に天板カルトゥーシュの 3 分の 2 に後世修復の充填があり、その上に文様が描かれていた。背面中央下部では塗膜欠損部に葛唐草文様が新たに描かれていた。
- 後世修復の上から塗り込まれた塗料に劣化が認められ、フレーク状になっていた。
- 天板のカルトゥーシュの輪郭に用いられた貝が本来の位置からずれて再接着されていた。
- ボーダーを中心に螺鈿の新補が認められた。
- 後世修復の充填材に用いられた白色下地が各所で露出していた。
- 引き出し上段の鍵金具がすべて欠失していた。
- 上段左右の鍵金具穴は後世修復時に充填し、螺鈿を新補して金色の文様を描いていた。
- 鍵金具、隅金具に施された鍍金がすでになくなっていた。

• 剥落した螺鈿の貝片が付属した。

6.1.4. 修復方針

修復方針は事前に東京文化財研究所からの提示を受けた。実際の修復にあたって再度検討を加えた後、変更が生じた部分については所蔵館および東京文化財研究所の担当者と修復者が協議して決定した。

次に、本作品の修復方針を以下に列記する。

• 文化庁が指導している文化財修復に準じて現状維持修復を基本とした。但し、観賞の妨げになる後世修復は簡易的に色合わせを行うこととした。
• 西洋修復材料の除去は表面に被っていた西洋塗料を対象としたが、金具に塗られた塗料は原則そのままとした。
• オリジナルの蒔絵や螺鈿に被った後世修復の文様や貝の欠失箇所に充填された修復材料は出来うる限り除去することとした。
• オリジナルの塗膜、蒔絵に損傷を与えないように西洋塗料を除去するため、数種類の溶剤をテストした上で慎重に溶剤を選択した。
• 隅金具はいったん取り外し、修復後に取り付けることとした。
• 引き出し上段中央の欠損した鍵金具と釘はオリジナルの金具と同素材で新補し、上段左右の欠損した鍵金具は新補しないこととした。
• 付属した貝片は照合した上で出来うる限り貼り戻した。
• 修復と並行してX線透過写真を撮影し、構造技法を確認するとともに、蛍光X線や赤外分光分析で材料の同定を行うこととした。

6.1.5. 修復工程

(1) 修復前調査

紫外線ランプによる調査を行い、西洋塗料の塗布範囲を明確にした。

箪笥の素地構造を目視で調査した結果、素地は檜の柾目材で、桟と背面には節のある木材を用いているのが分かった。木地は、左右側面と縦桟の合計4枚のみを縦に、他はすべて横方向に木目を通し、木釘を打って接合していた。桟は接合部に溝を切って接合していた。鍵金具と接するに桟の下部に穴を開け、鍵をかけると桟に鍵金具の一部がかかる構造となっていた。内側背面に木片が2か所付き、他の箇所も痕跡が残る個所もあることから、引き出しが内側に入りすぎないように前面の段差を調整したものと考えられる。

素地の収縮によって素地接合部に亀裂が認められた。特に、背面と両側面の木目の方向が異なるため、背面と側面上部に1mm程度の段差が出来ていた。螺鈿や漆塗膜が剥離し、すでにその多くが剥落していた。広い面積に数種類の後世修復が認められることから、何度も修復が行われたことが分かった。

(2) 修復前写真

修復前にカラー写真用デイライトランプと自然光を使って作品全体と損傷状態をデジタル写真で記録した。次に紫外線蛍光写真を撮影し、後世修復の状態を記録した。蛍光写真はブラックランプと紫外線カットのゼラチンフィルターを使用して、デジタルで記録した。

(3) 分析

修復前に赤外分光(FT-IR)による材料分析を行った。分析は東京文化財研究所保存修復科学センターの早川典子が担当した。天板の螺鈿剥落下の螺鈿接着材料と充填材料、後世修復の螺鈿接着材料をサ

ンプリングして分析した。その結果、螺鈿の接着材料は多糖類＋漆、後世修復の螺鈿接着材料はシェラック、充填材料は刻苧に類似した材料であると分かった。

次に、X線透過写真撮影を行った。撮影は天板と上段引き出しの欠損した鍵金具部分を対象とし、東京文化財研究所保存修復科学センターの犬塚将英が担当した。分析の結果、天板のX線透過写真には後世修復が観察出来、異なる材料を用いて何度も修復を行ったことが明確となった。さらに、上段引出の欠損した左右鍵金具部分の鍵穴には、金属の薄板が貼り込まれているのが分かった。この金属の薄板は制作当初に鍵があるように見せかけるために用いたものか、後世修復時に鍵穴を塞ぐために用いたものかは明確ではない。また、蛍光X線分析を行い、蒔絵に使われた材料や金具の材質などを調査した。この調査は東京文化財研究所保存修復科学センターの早川泰弘が行った。その結果、数種類の蒔絵粉と朱漆を用いて粉蒔きしていることが分かった。提金具、隅金具や鍵金具（外面）は銅製で、引出のつまみは鉄製であることから、引出しのつまみは後補と考えられた。

(4) 金具の取り外し

隅金具を取り外し、発泡ポリウレタンに位置が分からなくならないように仮保管した。提金具、鍵金具、引出しのつまみと丸足はそのままとした。

(5) クリーニング

塗膜と蒔絵表面に付着した埃と汚れを水や消毒用エタノールで湿らせた綿布や綿棒で取り去った。特に、隅金具際と金具下は長年に亘る埃や西洋塗料が溜まっていたため、剥離した螺鈿や塗膜に注意してクリーニングを行った。隅金具には埃や西洋塗料だけでなく、一部には緑青錆の付着が認められた。金具裏のクリーニングは消毒用エタノールおよびアセトンを用い、綿棒を用いて出来うる限り除去した。

(6) 養生

剥落の危険のある塗膜や螺鈿部分に小片にきった雁皮紙を上新粉糊で貼った。特に、背面上部の隅金具下の螺鈿と塗膜の剥離が著しく、同一箇所に数枚貼り作業中の剥落を予防した。

(7) 溶剤テスト

後世修復材料を対象に溶剤実験を行った。上段引き出し表面塗料と金色塗料を対象とし、消毒用エタノール、メタノール、アセトン、キシレン、酢酸エチル、ジメチルスルホキシド、テトラヒドロフラン（THF）、水、クリーンソルG，リグロインをテストした。その結果、表面塗料の除去にはメタノール、金色材料はTHFを用いるのが有効であると分かった。また、後世修復の塗料は螺鈿や漆塗膜の剥落止めに用いる水やリグロインでは溶けないことが分かった。このことから、螺鈿と漆塗膜の剥落止めを優先に仕事を進め、その後で後世修復の塗料を溶剤で除去する順序に変更した。

(8) 螺鈿の剥落止め

剥離した螺鈿に膠水溶液を筆と鼈甲篦を用いて含浸し、木枠とヒゴを用いて圧着した。膠はパールグルー（大王）約15%水溶液を用い、螺鈿との接触面にはシリコンとビニールシートを用いた。螺鈿の剥落止めは数日間放置し、膠が十分に硬化した後に余分な膠は拭き取った。背面の螺鈿では後世修復時に剥離したまま周囲を充填していたことから、充填剤の一部取り除いて螺鈿の剥落止めを行った。

(9) 塗膜の剥落止め

剥離した漆塗膜部分は初めに螺鈿と同じ方法で剥落止めした。さらに補強するため部分的に有機溶剤で希釈した麦漆を含浸し、木枠とヒゴで圧着した。

(10) 亀裂や割れの補強

素地接合部の亀裂や割れ部分に調整した麦漆を含浸し、強化した。引き出し上段の割れは、さらに麦漆に少量の木粉と地粉を入れた接着力のある充填材料で補強した。

(11) 西洋修復材料の除去

塗膜面に付着した西洋塗料をメタノールと綿棒を用いて除去した。除去は文様部分に損傷を与えないように慎重に進めた。文様以外の部分に付着した後世修復時に使用した金色材料はTHFと綿棒で除去した。

⑿ 螺鈿の取り外しと再接着

後世修復時にずれて接着された螺鈿をアセトンで取り外し、他の螺鈿と同じ技法で本来の位置に再接着した。

⒀ 貝片の照合と接着

付属した貝片の調査を行った。貝片はかなりの数があったが、貝の材料や技法などで分類した結果、いくつかの異なる作品からの貝片が多く混ざっていることが分かった。本作品の剥落部分と貝片を照合した結果、天板2、右側面2、左側面4個の貝片の位置が確認できた。貝片はそれぞれの位置に膠を用いて接着した。

⒁ 漆固め

劣化した塗膜と蒔絵の漆固めを行った。漆固めはクリーンソルGで希釈した透漆を用いて2回行った。余分な漆はリグロインで拭き取った。

⒂ 亀裂と割れの成形

亀裂と割れ部分に刻苧を充填した。刻苧にはエゾ松の木粉を使用し、表面に錆下地を施して表面を整えた。

⒃ 際錆

刻苧部分と塗膜や螺鈿の際に漆下地を僅かにつけて際剥落の予防をした。際錆に使用する下地には水干した赤砥の粉を使い、少量の油煙と混入した漆下地を使用した。

⒄ 色調整

西洋塗料の除去によって艶を失った後世修復部分や後世修復の下地が露出した部分の色合いを調整した。白色下地が露出した部分はアクリル絵の具を用いて色調整した。後世修復部分には、艶を調整するためにパラロイドB72 7%キシレン溶液を筆で薄く塗布し、余分な材料はレーヨン紙で拭き取った。

⒅ 鍵金具と釘の復元

上段引き出し中央の鍵金具と釘を現存の鍵金具と釘を参考に復元した。復元には銅を用い、ムトーハップで着色した。鍵金具と釘の復元は東京芸術大学の草野晃氏が担当した。引き出しに付く鍵金具には後世修復の塗料が被っていた。復元した鍵金具の質感を合わすためにパラロイドB72を薄く塗布したあとにアクリル絵の具で着色した。金具は釘跡を参考に本来の位置に取り付けた。

⒆ 隅金具の取り付け

別保管していた隅金具を元の位置に取り付けた。釘穴が緩くなっていた部分は柔らかい刻苧を充填してから釘を樫の棒で押し入れた。

⒇ 桐箱と外覆の作製

桐箱（横51.0cm 奥行39.3cm 高41.2cm）と外覆を新調した。桐箱は落蓋造りとし、引手として丸穴2個を付けたゲス板を設けた。桐箱は会津産の上質な材料を使用して作製した。外覆は羽二重を用い、前面左右の上下に紐を付けて取り外し易い形状とした。

(21) 修復後の記録作製

修復後の写真撮影を行い、修復記録をまとめて報告書を2部作成した。

6.1.6. 修復後の状態

詳細はTable 6.1を参照のこと。

6.1. Restoration Report

Yoshihiko Yamashita

6.1.1. Data

Title	*Cabinet with Floral Design*
Period	16th -17th century, Momoyama period
Owner	The Ashmolean Museum University of Oxford (United Kingdom of Great Britain and Northern Ireland)
Inventory number	EA1998.17

6.1.2. Restoration Data

Duration	May 2009 – March 2011
Place	Restoration Studio (Urushi), National Research Institute for Cultural Properties, Tokyo
Conservator	Yoshihiko Yamashita

6.1.3. Condition before Restoration

The following is a list of the condition of damage.

- The entire surface of the cabinet was covered with dust and soiling.
- Cracks were observed on various parts of the joints of the substrate.
- The substrate of the bottom board of the upper drawer was cracked in the middle from the front to the back.
- Western coating materials had been applied to the outside of the cabinet and almost all of the inside.
- The urushi coating film under the Western coating materials on the outside had deteriorated.
- There was significant lifting of the coating film and *raden*. Lifting was found over a large area in the cartouche on the top board.
- Some of the urushi coating film and *raden* had fallen from the cabinet, exposing the foundation.
- Parts of the *makie* and *tsukegaki* lines were lost and the *shitazuke urushi* had become exposed.
- There was damage caused by impact and abrasions on the entire cabinet. Damage was found on the surfaces of *makie* and *raden*. Part of the wooden substrate was exposed on the bottom boards of the drawers as a result of abrasion.
- The silver powder used for *enashiji* had corroded and changed color.
- Designs that had been made with Western restoration materials during past restorations were found at various places. Two-thirds of the cartouche on the top board, especially, had been either filled or designs had been added later. On the center lower portion of the back, arabesque design of *kuzu* vine had been made new on the area where the coating film had been lost.
- Deterioration was found on the coating materials that had been applied over areas treated during past restorations. These materials were flaking.

- The shell pieces used for the outline of the cartouche on the top board which had become displaced had been re-attached but not in their original positions.
- New *raden* shell pieces had been added especially on the borders.
- The white foundation used as a filler during past restorations had become exposed at various places.
- All of the metal lock plates on the upper drawer had been lost.
- The left and right key holes of the upper drawer had been filled in the past, new *raden* shell pieces had been attached and gold design drawn over the holes.
- Gilding on the metal lock plates and corner metal fittings had already been lost.
- Fragments of *raden* that had fallen accompanied the cabinet.

6.1.4. Restoration Plan

The restoration plan for the object had been presented beforehand by the National Research Institute for Cultural Properties, Tokyo. In beginning the actual work of restoration, details of the plan were discussed once again, and changes that were considered necessary were decided upon deliberation between the person in charge at the Institute and the conservator.

The following is a summary of the restoration plan.

- Maintenance of the present condition in the restoration of cultural properties advocated by the Agency for Cultural Affairs would be followed. However, traces of past restorations that might hinder appreciation would be treated simply by matching the colors.
- With regard to the removal of Western restoration materials, it was decided to remove the Western coating materials that covered the surface but the coating material over the metal fittings would be left untouched as a rule.
- Designs from past restorations that had been made over the original *makie* and *raden* as well as restoration materials used to fill places where the shell pieces had been lost would be removed as much as possible.
- In order to safely remove Western coating materials so that the original coating film and *makie* would not be damaged, solvents were carefully selected after testing several types.
- The corner metal fittings would be removed and re-attached after restoration.
- New metal lock plate and nail would be made using the same material as the original to replace the ones missing from the center of the upper drawer, but new ones would not be made for the lock plates on its left and right.
- The shell pieces that accompanied the cabinet would be checked and re-adhered as much as possible.
- X-ray radiographs would be taken during restoration to confirm the structural techniques, and X-ray fluorescence analysis and Fourier-transform infrared spectroscopy (FT-IR) would be performed to identify the materials.

6.1.5. Restoration Process

(1) Investigation before restoration

Investigation using a UV lamp was performed to clarify the extent to which Western coating materials had been applied.

As a result of visual inspection of the structure of the substrate, it was found that the substrate is

made of straight-grained cypress and that wood with nodes is used for the crosspieces and the back. The grains run vertically on the left and right sides and on the vertical crosspieces, while they run horizontally on all the other pieces. Wooden nails are used. Ditches are made on the joints of the crosspieces. There are holes on the underside of the crosspieces that are in contact with the metal lock plates so that a part of the lock would catch with the crosspiece when the key is turned. There are two places on the inside of the back where pieces of wood are attached and similar traces on other parts. It is thought that these pieces were used to align the surface of the drawers with that of the cabinet frame.

Cracks caused by shrinkage of the substrate were found around the joints of the substrate. A gap of approximately 1 mm was found on the back and the upper portion of the sides because the direction of the grain on the board for the back and that of the boards for both sides of the cabinet differ.

(2) Photographing before restoration

The entire cabinet and its condition of damage were photographed before restoration with a digital camera under a daylight lamp for color photographs and natural light. Then UV fluorescence photographs were taken and the condition of past restorations was recorded. For fluorescence photographs, a black lamp and a gelatin filter that would cut UV ray were used. Digital camera was used in this case also.

(3) Analysis

Material analysis using FT-IR was performed before restoration by Noriko Hayakawa of the Center for Conservation Science and Restoration Techniques of the Institute. Samples of the original adhesive and filler taken from places on the top board where *raden* pieces had fallen and samples of adhesive used in past restorations were analyzed. As a result, it was found that the adhesive for the *raden* contained polysaccharide and urushi, while that from past restorations was shellac. Moreover, it was found that the material used as filler was very similar to *kokuso*.

Next, X-ray radiography was executed. The top board and the missing metal lock parts on the upper drawer were photographed by Masahide Inuzuka of the same Center. As a result of analysis, traces of past restorations were observed on the X-ray radiograph of the top board, indicating that restoration had been done several times using different materials. Furthermore, it was found that a thin metal plates had been attached to the key holes of the missing left and right locks on the upper drawer. It is not clear whether these thin metal plates were used at the time the cabinet was manufactured to make it look as if there really were locks and keys or whether they were placed during past restorations to cover the key holes. In addition, X-ray fluorescence analysis of the materials used for *makie* and the metal fittings were conducted by Yasuhiro Hayakawa, also of same Center. As a result, it was found that several kinds of *makie* powder and *shu-urushi* were used for the *makie* decoration. Since the handles, metal corner fittings and the lock plates were made of copper while the finger grips of the drawers were made of iron, it is thought that the finger grips are later additions.

(4) Removing the metal fittings

The corner metal fittings were removed and temporarily stored on urethane foams to make sure that their positions would not become confused. Metal handles, lock plates, finger grips and legs were left untouched.

(5) Cleaning

Cotton cloth and cotton swabs moistened with water or ethanol for disinfection were used to remove the dust and soiling that had accumulated on the coating film and the surface of *makie*. Special attention

was paid to the lifted *raden* and coating film on the edges of the corner fittings when cleaning, because dust and Western coating materials had accumulated over the years on the edges of the corner metal fittings and under the other metal fittings. In addition, greenish blue patina was found on parts of the corner metal fittings. The back of the metal fittings were cleaned as much as possible with ethanol for disinfection and acetone, using cotton swabs.

(6) Temporary facing

Small pieces of *gampi* paper were adhered with paste made from rice powder to the coating film and *raden* that were at risk of falling. The condition was especially serious under the corner metal fittings on the upper portion of the back side. Several pieces of paper were adhered to one particular place to prevent the coating film and *raden* from becoming detached during restoration.

(7) Solvent tests

Solvents were tested for removing materials used during past restorations. For the surface coating material on the upper drawer and the gold colored material, ethanol for disinfection, methanol, acetone, xylene, ethyl acetate, dimethyl-sulfoxide, tetrahydrofuran (THF), water, Cleansol G, and ligroin were tested. As a result, it was found that methanol was effective for the removal of the surface coating material while THF was effective for the removal of the gold colored material. It was also found that the coating materials used in past restorations will not dissolve with water or ligroin which are used in the consolidation of *raden* and urushi coating film. Thus, it was decided to place priority on consolidating *raden* and urushi coating film and then to remove the coating materials from past restorations with a solvent.

(8) Consolidation of *raden*

A brush and a tortoise spatula were used to impregnate an animal glue solution to the lifted *raden* which were then press-stabilized with a wooden frame and bamboo sticks. An approximately 15 % aqueous solution of Pearl Glue (Daio) was used. Silicon sheet and vinyl sheet were placed on the surface of *raden*. Treatment was left as it was for several days and excess animal glue was wiped off after it had hardened sufficiently. Since the surroundings of the lifted *raden* on the back had been filled during past restorations without treating the lifted shell pieces, some of the filling agent was removed to consolidate them.

(9) Consolidation of the lifted urushi coating film

Lifted urushi coating film was first treated in the same way as were the *raden*. Then they were impregnated with *mugi-urushi* diluted with organic solvent in order to consolidate them. This was followed by press-stabilization with a wooden frame and bamboo sticks.

(10) Reinforcement of cracks

Adjusted *mugi-urushi* was impregnated into cracks around the joints of the substrate for reinforcement. The crack on the upper drawer was further reinforced by using filling material composed of *mugi-urushi* to which a small amount of sawdust and *jinoko* were added for greater adhesive force.

(11) Removal of Western restoration materials

Methanol and cotton swabs were used to remove the Western coating materials that had become attached to the coating film surface. This was done carefully so as not to damage the parts with designs. Gold coloring material used during past restorations that had become attached to parts other than the designs were removed with THF and cotton swabs.

(12) Removal and re-adhesion of *raden*

Raden that had been adhered during past restorations but not in their original positions were removed with acetone and then re-adhered in their original positions using the same technique that was used for other shell pieces.

(13) Checking and adhesion of shell pieces

The shell pieces that accompanied the cabinet were investigated. There were quite a number of shell pieces, but by categorizing them according to materials and techniques it was found that they included several types of materials. By matching the parts where the original shell pieces had fallen and the shell pieces themselves, it was possible to confirm the positions of 2 shell pieces on the top board, 2 on the right side and 4 on the left side. They were adhered to their respective positions with animal glue.

(14) *Urushigatame*

Deteriorated coating film and *makie* were consolidated with urushi. For *urushigatame*, *suki-urushi* diluted with Cleansol G was applied twice. Excess urushi was wiped off with ligroin.

(15) Shape-forming of the cracks

Kokuso was filled into cracks. Sawdust of Japanese spruce was used to make *kokuso*. *Sabishitaji* was applied on the surface which was then adjusted.

(16) *Kiwasabi*

A small amount of urushi foundation was applied to the edges of parts filled with *kokuso* as well as those of the coating film and *raden* in order to prevent the coating film and *raden* from falling. For *kiwasabi*, powder of red *tonoko* that had been elutriated was used; a small amount of oil soot was added.

(17) Color adjustment

Color of parts where restorations had been done in the past but where gloss had been lost because of the removal of Western coating materials and of parts where the foundation from past restorations had become exposed were adjusted. Acrylic ink was used to adjust the color of parts where the white foundation had become exposed. To adjust the gloss, a 7 % xylene solution of Paraloid B72 was applied thinly with a brush on areas where restorations had been done in the past. Excess material was wiped off with rayon paper.

(18) Reproduction of the metal lock plate and nails

Metal lock plate and nails of the upper drawer were reproduced. Copper was used to reproduce them; they were colored with 610 HAP (metal coloring material with sulfur as main component). Reproduction of the metal lock plate and nails was done by Akira Kusano of the Tokyo University of the Arts. Since the metal lock plate on the drawer had been covered with coating material in a past restoration, to match the atmosphere, the reproduced plate was thinly coated with Paraloid B72 and then colored with acrylic ink. Metal fittings were returned to their original positions, paying attention to traces of nails.

(19) Attaching of corner metal fittings

Corner metal fitting that had been stored separately were returned to their original positions. Parts where the nail holes had become loose were filled with soft *kokuso*. An oak stick was used to push in the nails.

(20) Manufacture of a paulownia box and a cover

A paulownia box (W 51.0 cm, D 39.3 cm and H 41.2 cm) and a cover were newly made. The paulownia box was made in such a way that its front board would slide down to serve as the lid

(*otoshibuta-style*). It was also equipped with an extra bottom board that can be pulled out by means of two holes at the front. High quality wood from Aizu area was used to make the paulownia box. *Habutae* silk was used for the cover, and cords were attached to the upper and lower portions of the front piece and the left and right pieces so that they can be tied. This makes it easy to put on or take off the cover.

(21) Compilation of a record after restoration

Photographs were taken after restoration and two copies of the restoration report were made.

6.1.6. Condition after Restoration

See Table 6.1.

6. 2. 作品解説

東京国立博物館
竹内 奈美子

桃山期から江戸時代初期に、ヨーロッパなどへの輸出用に作られた漆器の一つである。3段7個の引出しを収めた箪笥で、上段には横長の引出しを一つ、中段と下段にはそれぞれ3個ずつの小さな引出しを並べている。箪笥の正面・天面・側面・背面や引出し前面は、各面を平蒔絵と螺鈿による七宝繋文や鋸歯文などの幾何学文様で縁取り、その内に桐・橘・楓・桔梗や鳥などを平蒔絵と絵梨子地・螺鈿で表わしている。

この箪笥と同じような文様構成で同様に3段7個の引出しを収めた、ほぼ同じ寸法の箪笥が、ウィーン美術史博物館（オーストリア）に保管されている。ハプスブルグ家の家系で最初に大規模な美術品収集を行った人物として有名な、チロル大公・フェルディナント2世のコレクションの一つとして伝えられた。大公の死後、1607年に記された収蔵品目録に記載されるものと見なされ、ヨーロッパに伝わった日本製漆器で最も古い記録を持つ作例として、特に有名である。同じ形式と文様構成をもつアシュモリアン博物館のこの箪笥も、同じ時期に制作、輸出されたものと考えられる。

6.2. Description of the Artwork

Namiko Takeuchi
Tokyo National Museum

The object discussed is one of the urushiware made sometime between the Momoyama period and the early Edo period for export to the West. The cabinet has seven drawers arranged in three tiers: the top tier has one wide drawer while the middle and the bottom tiers have three small drawers each. The front, top, right and left sides, and back as well as the front face of the drawers are bordered with geometric designs like interlinking circles and saw-teeth patterns in *hiramakie* and raden, while on the inner side of these borders one designs of paulownia, mandarin orange trees (Citrus tachibana), maple leaves, bellflowers, and some birds are expressed in *hiramakie*, *enashiji* and *raden*.

A cabinet having similar design composition, similar seven drawers arranged in three tiers and similar size as this one is stored at the Kunsthistorisches Museum, Wien. It has been passed down as one of the collections of Ferdinand II, Archduke of Tyrol, who is well known as the first person among the Hapsburg family to have had a large collection of works of art. It is thought to be the one listed on the inventory of his collections compiled in 1607 after his death. It is especially famous as the oldest example of Japanese urushiware in Europe that has been recorded. It is thought that the cabinet in the Ashmolean Museum, which is of the same style and which has the same design composition, was made and exported during the same period.

付録 6. 1. 蛍光X線分析結果

東京文化財研究所
早川 泰弘

分析日時・場所

2011 年 3 月 22 日（火）、東京文化財研究所　修復アトリエ（漆）

分析装置・条件

装置：	ポータブル蛍光X線分析装置 SEA200（セイコーインスツルメンツ）
X線管球：	Rh（ロジウム）
管電圧・管電流：	50kV、100μA
X線照射径：	φ 2mm（フィルタなしコリメータ使用）
測定時間：	100 秒
測定雰囲気：	大気
装置ヘッド～資料間距離：	約 10mm
測定箇所：	Table 6.2、Fig. 6.25 参照

分析結果

- 得られた蛍光X線強度を Table 6.3 に示した。
- 今回の測定結果に関しては、下記の事項を十分考慮した上で、測定結果の解釈が必要である。

(1) 蛍光X線分析では試料に含まれている元素を特定することはできるが、その構造（化学式）を知ることはできない。
(2) 今回の測定では、有機物（主元素 C, N, O, H）や染料などの検出は行えない。
(3) 無機物であっても、軽元素（例えば Al, Si, S, Cl など）の検出は行えない。
(4) 得られた蛍光X線強度は表面からある深さまでの組成情報である（金属銅の場合：数10μm程度）。
(5) 単一部位の測定結果だけからは、複数の元素が混合されているのか、それらが層状に存在しているのかの判断はできない。
(6) 蛍光X線の検出効率はエネルギーによって大きく異なるため、元素間での蛍光X線の強度比は実際の濃度比とは一致しない。

＜コメント＞

- 測定箇所 No. 1 土坡に使われている銀蒔絵と、測定箇所 No. 2、3 に使われている銀蒔絵では Ag/Cu 比がわずかに異なっている。
- 測定箇所 No. 5、13 に使われている赤色材料は Hg 系材料（水銀朱）であると考えられる。
- 測定箇所 No. 6、11、14 の後補材は金ではなく、Cu-Zn 合金（真鍮）である。測定箇所 No. 15 ではさらに胡粉が混ぜられている可能性がある。
- 測定箇所 No. 7 は貝の上の置かれている金線部分を測っているため、Ca が大量に検出されている。

- 測定箇所 No. 8、9 の金属は銅である。Hg,Pb も同時に検出されているが、その由来は特定できない。
- 測定箇所 No. 10、17、18 の金属は Cu-Zn 合金（真鍮）であるが、測定箇所 No. 20、21 の金属は銅である。

Appendix 6.1. Results of X-ray Fluorescence Analysis

Yasuhiro Hayakawa
National Research Institute for Cultural Properties, Tokyo

Date and place of analysis

Tuesday, March 22, 2011
Restoration Studio (Urushi), National Research Institute for Cultural Properties, Tokyo

Apparatus and conditions for analysis

Apparatus :	Portable X-ray fluorescence spectrometer SEA200 (Seiko Instruments Co. Ltd)
Target :	Rh (rhodium)
Tube voltage, current :	50 kV, 100 μA
X-ray radiation diameter :	φ2 mm (collimator without filtering)
Measuring time :	100 sec.
Measuring atmosphere :	Air
Distance between the apparatus and the sample :	approximately 10 mm
Measuring points :	See Table 6.2 and Fig. 6.25

Analytical results

- X-ray fluorescence intensity obtained is shown in Table 6.3.
- The following points should be taken into careful consideration when interpreting the measured results.
  (1) With X-ray fluorescence analysis, it is possible to identify elements contained in a sample but it is not possible to find their structure (chemical formula)
  (2) It is not possible to detect organic substances (major elements C, N, O, H) or dyes in this measurement.
  (3) It is not possible to detect light elements even if they are inorganic substances (i.e. Al, Si, S, Cl)
  (4) X-ray fluorescence intensity obtained shows an average composition from the surface to a set depth (for metallic copper, approximately several 10 μm in depth).
  (5) It is difficult to determine only from a single measurement whether several elements are combined or whether they are in layers.
  (6) Since detection efficiency of X-ray fluorescence differs greatly by energy, the ratio of intensity in X-ray fluorescence and the actual ratio of concentration do not coincide.

<Comments>

- The silver *makie* at measuring point No. 1 Embankment and that at measuring points Nos. 2 and 3 differ slightly in Ag/Cu ratio
- The red material used at measuring points Nos. 5 and 13 is thought to be Hg-based material (vermilion).

- The material added later at measuring points Nos. 6, 11 and 14 is not gold but Cu-Zn alloy (brass). At measuring point No. 15 there is a possibility that calcium carbonate (*gofun*) was added as well.
- Since the gold line on top of a shell piece was measured at measuring point No. 7, a great amount of Ca was detected.
- The metal at measuring points Nos. 8 and 9 is copper. Although Hg and Pb were also detected, their origin could not be determined.
- The metal for measuring points Nos. 10, 17 and 18 is Cu-Zn alloy (brass), but the metal at measuring points Nos. 20 and 21 is copper.

付録 6. 2. 材質・技法に関する調査

東京文化財研究所
北野 信彦

調査対象試料

花樹鳥蒔絵螺鈿筆筒における基本的な蒔絵加飾の材質・技法を分析するため、先方美術館キュレーター担当者の了承を得て破片試料2試料を対象に調査を行った。本資料は典型的な桃山時代（16世紀末～17世紀前期）頃に作成されたいわゆる「南蛮漆器（近世初期輸出漆器）」であるが、ほぼ全面に西洋塗料が塗布され、さらに欠損部分に文様が描き足されるなど、後世の西洋修復の手がかなり入っていた。今回、山下好彦氏による修復作業に伴い、隅金具を一旦取り外した際、金具下の部分からオリジナルの蒔絵塗装の箇所が確認された。このオリジナルの塗装箇所では木胎の上に施された下地が脆弱であったためか、損傷が著しく、剥離した小破片も幾つかみられた。本調査ではこのような剥離小破片のうち、2試料を注意深く回収し、以下の分析に供した。

調査方法

(a) 漆塗り表面や下地の状態、蒔絵や螺鈿加飾の表面観察

まず肉眼で漆塗り表面や下地の状態、蒔絵・螺鈿加飾の状態を観察した後、（株）キーエンス社製のVHX-1000型デジタルマイクロスコープを用いた細部の観察を行った。

(b) 漆塗り構造の観察

隅金具下箇所から採取した1㎜×3㎜程度の漆膜剥落片は、合成樹脂（エポキシ系樹脂／アラルダイトGY-1251J.Pハードナー HY-.837）に包埋した後、この断面を研磨して薄層プレパラートを作成した。この塗装断面の漆塗膜面の厚さ、塗り重ね構造、顔料粒子の大きさ、下地の状態などについて、顕微鏡を用いた落射観察と透過観察を併用した。

(c) 蒔絵粉材料や下絵漆の材質

蒔絵粉材料および下絵漆の材質に関する定性分析は、漆膜剥落片をカーボン台に取り付け、（株）堀場製作所 MESA-500型の蛍光X線分析装置に設置し、電子線（X線）を照射し、特性X線を検出した。設定条件は以下の通りである。分析設定時間：100秒、試料室内は真空状態、X線管ターゲットはRh、X線管電圧：15kVおよび50kV、電流：240μAおよび20μA、検出強度：12.00cps、定量補正はスタンダードレスFP法である。

(d) 漆塗膜中に含まれる主要脂質成分の分析＝熱分解GC/MS質量分析

漆膜塗料の主要脂質成分の詳細な分析は、試料小片を熱分析装置に入れ、500℃で12秒間熱分解させた上でGC/MSに導入した。測定装置は、熱分析装置（フロンティア・ラボ製PY-2010D）とガスクロマトグラフ(HP製HP689)、質量分析装置(HP製HPG5972A)により構成され、分離カラムはUltra Alloy PY-1 (100%methylsillicone , 30m × 0.25㎜ i.d, film 0.25μm) を使用した。なおこの分析は、明治大学理工学部および当研究所客員研究員である本多貴之が担当した。

調査結果

(1) 本資料の加飾部分を拡大観察した結果、蒔絵粉粒度はやや粗い粉と微細粉が混在した不均一な状態

であった（Fig. 6.26）。

(2) 螺鈿の加飾は、①貝のパーツを直接木胎に接着する、②サビ下地を貝の厚みまで付ける、③螺鈿の貝と下地の表面を 平滑になるよう研ぐ、④若干下地部分のみを塗り厚み分下げた上、地の黒漆を塗装する、⑤全体を研いで螺鈿の上に乗った余分な漆層を薄くさせた上で、剥がして螺鈿の表面をむき出しにする、という作業工程を経ていた。

(3) 回収した塗膜破片の断面観察を行った結果、下地は、細かい粘土や珪藻土と糊もしくは膠を混ぜた淡い茶褐色系を呈する泥下地（生漆を用いた堅下地・本下地より堅牢性に欠ける）の可能性が高いと認識した。ただし、本調査では分析試料が微細なため下地に混和されていると推定される膠・糊や生漆の科学的識別分析を行っていない。そのため炭粉を使用した下地の総称である「炭粉下地」との対比用語である、粘土鉱物を使用した下地の総称である「サビ下地」とした。

(4) 平蒔絵の加飾は、①木胎の上にサビ下地層を施す、②このサビ下地の上に薄い黒い炭層を一層塗って下地の色相を黒色とする、③この下地の上に上塗りの赤褐色系の漆を一層塗装して地の黒漆を作成する、④この地の黒漆の上に、接着材料でもある下描の赤色漆を付ける、⑤蒔絵粉を蒔き放して平蒔絵加装飾とする、という作業工程を経ていた（Fig. 6.27）。

(5) 回収した漆塗膜破片の蒔絵部分を蛍光X線分析した結果、金(Au)とともに水銀(Hg)やごく微量の銀(Ag)が検出された（Fig. 6.28）。そのため、下描の赤色漆はベンガラ漆ではなく朱漆であること、金蒔絵粉にはごく微量の銀が混入していること、などが確認された。これは、本報告書に所収されている早川泰弘氏による分析結果とも齟齬がないほぼ同様の内容である。

(6) 回収した漆塗膜破片のPY-GC/MS分析を行った結果、チチオールやラッコ―ル成分ではなく、ウルシオールに由来するピークが確認された（Fig. 6.29）。そのため、この資料の地の黒漆には、タイ・ビルマ・カンボジア産やベトナムなどの東南アジア産輸入漆塗料ではなく、国産の日本産もしくは中国産漆塗料が用いられているものと理解した。

Appendix 6.2. Investigation on the Materials and Techniques

Nobuhiko Kitano
National Research Institute for Cultural Properties, Tokyo

Samples for Investigation

For the fundamental analysis of the materials and techniques related to the *makie* decoration of the *Cabinet with Floral Design*, investigation was conducted on 2 sample fragments obtained with the permission of the curator in charge at the Ashmolean Museum. The cabinet is a typical example of what is known as "Namban urushiware" (export urushiware of the early modern period) manufactured during the Momoyama period (late 16th century – first half of the 17th century). However, it showed traces of having been restored in the West in later years: most of its surface had been coated with Western material and designs had been newly made on areas with losses. When the corner metal fittings were temporarily removed in the process of its restoration recently by Yoshihiko Yamashita, the original *makie* coating was discovered from underneath. It appears that the foundation that had been applied over the wooden substrate was fragile here so that damage was serious; several small lifted fragments were also discovered. For this investigation, 2 samples were carefully taken from these lifted fragments and analyzed as noted below.

Methods of Investigation

(a) Observation of the surface of the urushi coating, condition of the foundation, *makie* and *raden* decorations

After first observing the surface of the urushi coating, the condition of the foundation, and that of the *makie* and *raden* decorations with the naked eye, details were observed using VHX-1000 digital microscope of Keyence Japan.

(b) Observation of the structure of the urushi coating

Fragments of urushi film approximately 1 mm x 3 mm that were sampled from under a corner metal fitting were first mounted on synthetic resin (epoxy-type resin/Araldite GY-1251J.P Hardner HY-837).Then a thin layer of the sample was made by grinding its cross- section and mounting it on a slide. This was observed under a microscope in order to examine the thickness of the urushi coating film, the structure of the coating layersthe size of pigment particles and the condition of the foundation.

(c) Materials of *makie* powder and urushi for draft drawing

For qualitative analysis of the materials for *makie* powder and urushi for the draft drawing, detached fragments of urushi film were first placed on a sample holder and then put on an X-ray fluorescence spectrometer MESA-500 of HORIBA Electron beam (X-ray) was irradiated and character X-ray was detected. Conditions for analysis were as follows: time – 100 sec., condition of the chamber – vacuum, target – Rh, tube voltage 15 kV and 50 kV, tube current – 240 μA and 20 μA, intensity detected – 12.00 cps.

(d) Analysis of the major lipid component contained in the urushi coating film by pyrolosis GC/MS

For detailed analysis of the major lipid component of the urushi coating film, a small sample fragment was placed into a pyrolysis apparatus and thermally decomposed for 12 seconds at 500°C and then injected into GC/MS. The apparatus for measurement consisted of a thermal analysis instrument (PY-2010D, Frontier Laboratories), gas chromatograph (HP689, HP) and mass spectroscope (HPG5972A, HP). Ultra Alloy PY-1 (100 % methylsillicone, 30 m x 0.25 mm i.d, film 0.25 μm) was used for capillary column. This analysis was conducted by the School of Science and Technology of Meiji University and Takayuki Honda, visiting researcher of the Institute.

Investigation Results

(1) As a result of observation of the details of decoration on the object, it was found that the particles of *makie* powder were uneven, including coarse ones and very fine ones (Fig. 6.26).

(2) The *raden* decoration had been made by following the procedures below. 1) Shell pieces were directly adhered to the substrate. 2) *Sabi shitaji* was applied to the level of the shell pieces. 3) The surface of the *raden* shell pieces and the foundation were ground flat. 4) After slightly lowering the foundation (to the thickness of the coating), black urushi for the foundation was applied. 5) The excess urushi layer on top of the *raden* was thinned down by grinding the entire surface in order to expose the surface of the *raden*.

(3) As a result of the observation of the cross-section of the sampled coating film fragment, it was found that there is a great possibility of brownish doro foundation consisting of fine clay or diatomaceous earth mixed with paste or animal glue having been used for the foundation. Nevertheless, since the sample for analysis was very small, scientific discriminative analysis was not conducted for the animal glue, paste or raw urushi assumed to have been mixed into the foundation. For this reason, the foundation is referred to as "*sabi shitaji*," which is the generic term for foundation using clay minerals rather than "*sumiko shitaji*," which is the generic term for foundation using charcoal powder.

(4) *Hiramakie* decoration was made in the following way: 1) *Sabi shitaji* was applied to the wooden substrate. 2) A layer of thin black charcoal was applied on top of this *sabi shitaji* to produce black color. 3) One layer of reddish-brown urushi was applied over this foundation to produce the black urushi ground. 4) Red urushi was applied over this black urushi ground to serve as an adhesive and the draft drawing. 5) *Makie* powder was sprinkled for *hiramakie* decoration (Fig. 6.27).

(5) As a result of X-ray fluorescence analysis of the *makie* parts on the fragments of urushi coating film that were collected, gold (Au), mercury (Hg) and a very small amount of silver (Ag) were detected (Fig. 6.28). For this reason, it was confirmed that *bengala urushi*, which is red urushi, and not *shu-urushi* was used for the draft drawing and that a very small amount of silver was mixed into the gold *makie* powder. This corresponds almost completely with the results of analysis performed by Yasuhiro Hayakawa of the Institute.

(6) As a result of PY-GS/MS analysis of the fragment of the urushi coating film, a peak that is derived from urushiol, rather than from thitsiol or laccol, was confirmed (Fig. 6.29). For this reason, it is understood that the black urushi used for the ground of this object is not urushi produced in and imported from Thailand, Burma, or Cambodia or in Southeast Asian countries like Vietman but domestic urushi or urushi coating material produced in China.

付録 6. 3. 接着材料の分析

東京文化財研究所
早川 典子

試料

A. 螺鈿を接着していた黒色接着材料（オリジナルと推定）
B. 螺鈿を接着していた褐色接着材料（後補材料と推定）
C. 螺鈿を接着していた褐色接着材料（後補材料と推定）

参照試料

(a) 刻苧
(b) シェラック

赤外線スペクトル分析

分析機器：FT-IR 8700 (島津製作所) による ATR 分析（Dura sample IR）

- 得られたスペクトルを Fig. 6.30 ～ Fig. 6.32 に示す。
- 試料Aのスペクトルからは 1630cm^{-1} と 1010cm^{-1} に強い吸収が得られ、これはエーテルの炭素 - 酸素結合と考えられる。また、水酸基由来と考えられる 3000cm^{-1} 付近の吸収も得られた。スペクトルはほぼ完全に参照試料 (a) の刻苧と一致した。
- 試料Bのスペクトルは参照試料 (b) シェラックと一致した。
- 試料CからはC-Hの伸縮振動による 2920cm^{-1} と 2850cm^{-1} とC=0由来と思われる 1700cm^{-1} の吸収が得られた。当初、試料Cはその色や状態から刻苧と考えられたが、IRスペクトルは刻苧とは一致しないため、他の材料である可能性が高い。

Appendix 6.3. Report on the FT-IR of the Adhesives and Consolidants

Noriko Hayakawa
National Research Institute for Cultural Properties, Tokyo

Samples

A. Black adhesive underneath a *raden* shell piece that was suggested to be an original material
B. Dark brown adhesive underneath a *raden* shell piece that was suggested to be a restoration material
C. Dark brown consolidant underneath a *raden* shell piece that was suggested to be restoration material

Reference materials

(a) *Kokuso* which is a mixture of *urushi*, sawdust and wheat flour
(b) Shellac

Fourier transform infrared spectroscopy

Instrument : FT-IR 8700 (Shimadzu Corporation) with Dura sample IR attached

- The spectra are shown in Fig. 6.30 - Fig. 6.32.
- Spectrum of sample A had three strong absorptions : 1630 cm^{-1}; 1010 cm^{-1} that was assigned to C-O of ether, and around 3000 cm^{-1} that was assigned to O-H group. The spectrum pattern of sample A was similar to reference (a) *kokuso*.
- Spectrum of sample B showed the same pattern as that of reference (b) shellac.
- Spectrum of sample C had two sharp absorptions at 2920 cm^{-1} and 2850 cm^{-1} that were assigned C-H to stretching vibration. Absorption band was also detected around 1700 cm^{-1} suggesting C=O bond. Sample C had been thought *kokuso* because of its conditions, but the spectrum of this sample did not correspond to *kokuso* spectrum.

Table 6.1　寸法
Dimensions

横 Width (cm)	奥行 Depth (cm)	高さ Height (cm)
44.4	30.1	30.9

金具も含む
including the metal fittings

Table 6.2　蛍光 X 線分析結果
Measuring points for X-ray fluorescence analysis

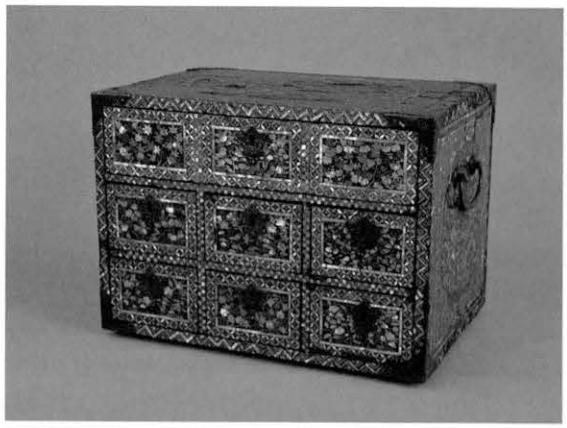
測定箇所 No.	部位 Measuring point
1	土坡　銀蒔絵 Embankment, silver *makie*
2	花　銀蒔絵 Flower, silver *makie*
3	葉　銀蒔絵 Leaf, silver *makie*
4	花　金蒔絵 Flower, gold *makie*
5	茎　赤色 Stalk, red
6	金色　後補 Gold color, later addition
7	鳥の羽　金色 Bird feather, gold
8	取手金具 Handle, metal fitting
9	金具取付部 Root of the metal fitting
10	隅金具 Corner metal fitting
11	上端　金色　後補 Upper part, gold, later addition
12	上端　貝剥落部　茶色 Upper part, shell lost, brown
13	茎の横　赤色線 Next to the stalk, red line
14	端部　金色　後補 Edge, gold, later addition
15	端部　銀色　後補 Edge, silver, later addition
16	鍵穴部（X 線不透過） Key hole (radiopaque)
17	鍵部　座金 Lock, washer
18	鍵部　座金 Lock, washer

19	引出の引手 Pull of the drawer
20	鍵部　座金　地金露出部 Lock, washer, bare metal exposed
21	鍵部　座金　地金露出部 Lock, washer, bare metal exposed

Table 6.3　蛍光 X 線分析結果
Results of X-ray fluorescence analysis

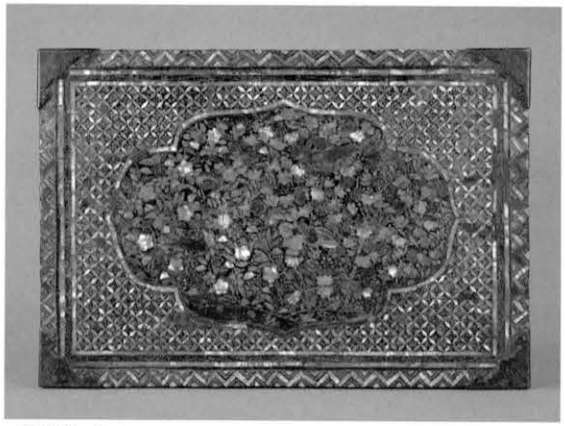
測定箇所 No.	蛍光 X 線強度 (cps)								
	カルシウム Calcium (Ca-Kα)	クロム Chromium (Cr-Kα)	鉄 Iron (Fe-Kα)	銅 Copper (Cu-Kα)	亜鉛 Zinc (Zn-Kα)	銀 Silver (Ag-Kα)	金 Gold (Au-Lβ)	水銀 Mercury (Hg-Lβ)	鉛 Lead (Pb-Lβ)
1			26.0	7.0		5.1		0.6	
2			21.7	3.4		6.0		13.2	
3			31.7	1.8		4.2		16.7	
4			48.6	0.2		0.2	16.9	12.6	
5			46.1				6.1	7.3	
6			77.3	299.3	62.5				
7	171.9						1.0	0.3	
8	8.0		15.8	1101.4				46.4	10.4
9	18.3		14.8	1735.5			2.8	23.7	6.7
10			12.8	1145.2	136.0			26.3	6.7
11	23.0		195.4	44.3	9.7				
12	16.3		102.5						
13	1.9		57.8					5.6	
14	67.1			130.2	25.7				8.1
15	124.2		2.1	12.7	0.1				0.2
16	228.6		1.6	11.8					
17			13.1	885.8	243.3			30.8	5.6
18			11.1	1235.2	717.8				0.3
19	8.6		1199.8						
20			5.1	1461.1					
21			10.8	1819.4					

a 修復前　Before restoration

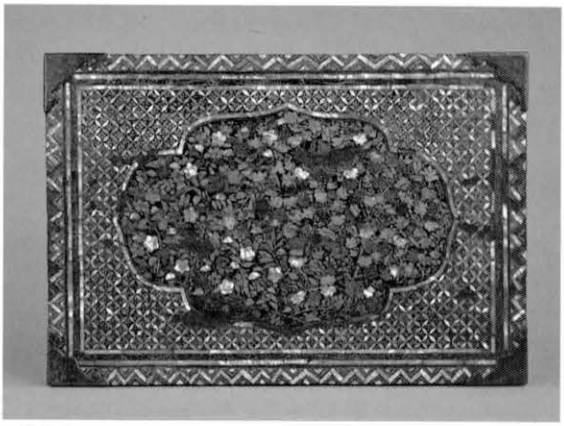


b 修復後　After restoration

Fig. 6.1 全体　Whole

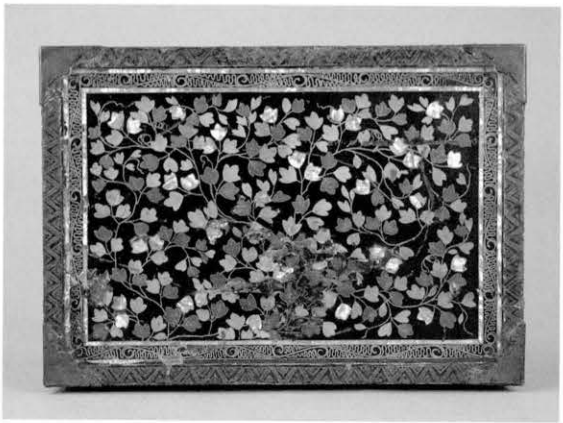


a 修復前　Before restoration

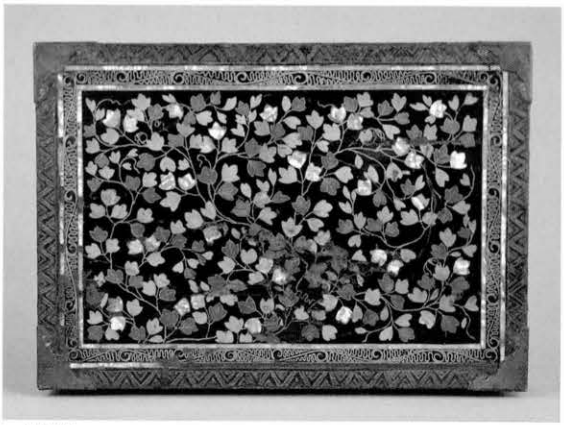


b 修復後　After restoration

Fig. 6.2 天板部分　Top board

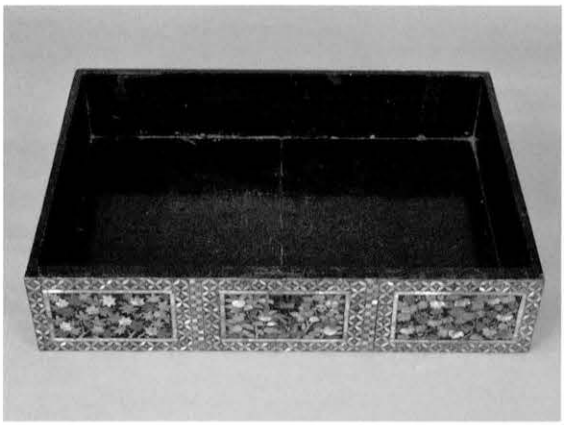


a 修復前　Before restoration

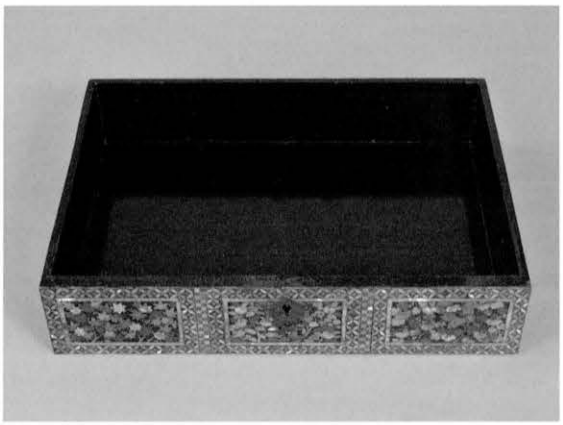


b 修復後　After restoration

Fig. 6.3 背面部　Back



a 修復前　Before restoration



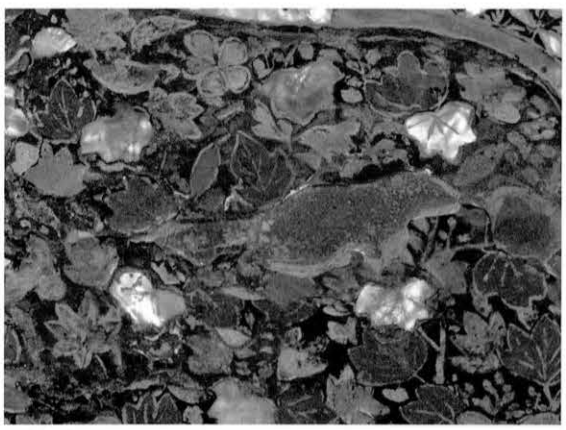
b 修復後　After restoration

Fig. 6.4 上段引き出し部分　Upper drawer

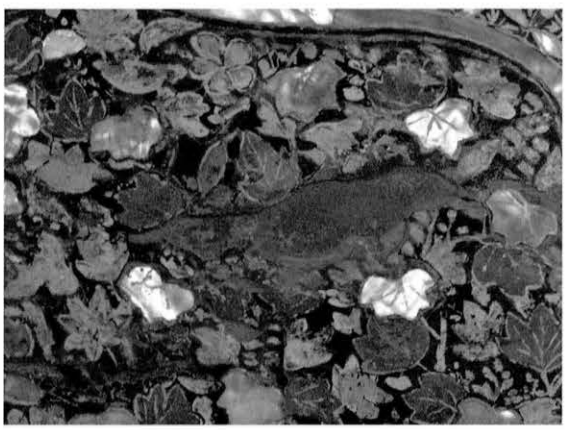
a 修復前　Before restoration

b 修復後　After restoration

Fig. 6.5 漆塗膜の剥離と後世修復材料の付着　左側面
Lifted urushi coating film and traces of past restorations



a 修復前　Before restoration



b 修復後　After restoration

Fig. 6.6 螺鈿の剥落と西洋塗料による文様の書き込み
Parts where raden has fallen and designs have been drawn with Western coating materials

a 修復前　Before restoration

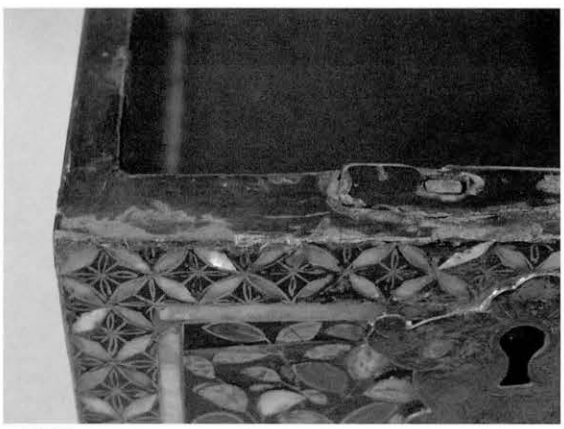
b 修復後　After restoration

Fig. 6.7 剥落部分に使用された後世修復材料　右側面下部
Restoration material from the past used on a lost area, lower portion on the right side

a 修復前　Before restoration

b 修復後　After restoration

Fig. 6.8 後世修復による文様の書き込みと西洋修復材料　背面部分
Drawing of a design using Western restorations materials during past restorations, back



a 修復前　Before restoration

b 修復後　After restoration

Fig. 6.9 金色材料の付着　引き出し上部
Gold coloring material on the upper part of a drawer

Fig. 6.10 埃と西洋塗料の付着　箪笥内部　修復前
Dust and Western coating materials that have accumulated, inside the cabinet, before restoration

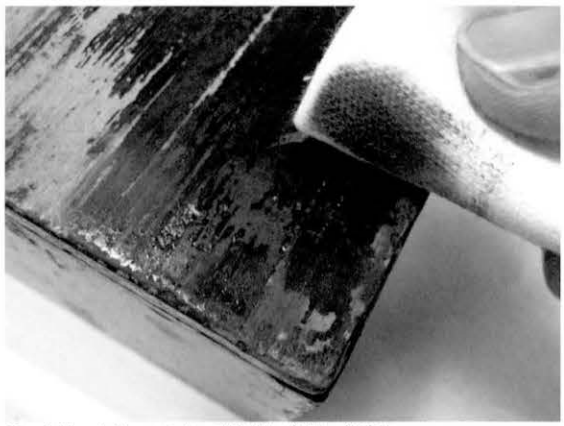


Fig. 6.11 クリーニング　引き出し裏側　修復中
Cleaning, underside of a drawer, during restoration

Fig. 6.12 クリーニング　天板ボーダー部分　修復中
Cleaning, border of the top board, during restoration

Fig. 6.13 隅金具の取り外し　修復中
Removing a corner metal fitting, during restoration

Fig. 6.14 膠水溶液による螺鈿の剥落止め　修復中
Using animal glue solution to consolidate *raden*

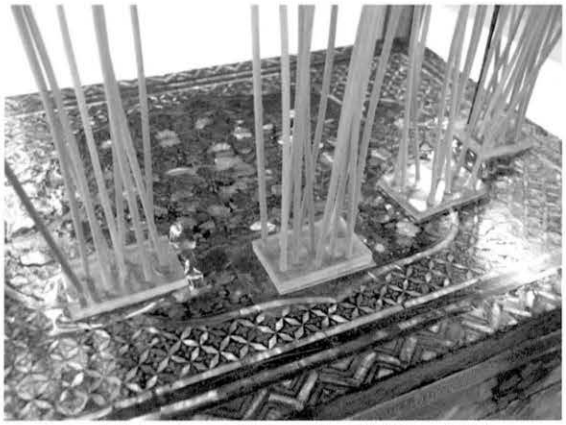


Fig. 6.15 木枠とヒゴによる螺鈿の圧着　天板部分　修復中
Press-stabilizing *raden* with a wooden frame and bamboo sticks

Fig. 6.16　亀裂の接着と充填　上段引き出し部分　修復中
Adhering and filling a crack, upper drawer, during restoration

Fig. 6.17　麦漆による漆塗膜の剥落止め　修復中
Using *mugi-urushi* to consolidate the urushi coating film

Fig. 6.18　際錆　背面部分　修復中
Kiwasabi, back, during restoration

Fig. 6.19　漆固め　修復中
Urushigatame, during restoration

Fig. 6.20　色調整　背面後世修復部分　修復中
Adjusting color, part on the back restored in the past, during restoration

Fig. 6.21　復元した鍵金具の位置確認　上段引出し中央部　修復中
Checking the position of the reproduced metal lock plate, upper drawer, during restoration

Fig. 6.22　隅金具の取り付け　背面下部　修復中
Attaching a corner metal fitting, lower portion of the back, during restoration

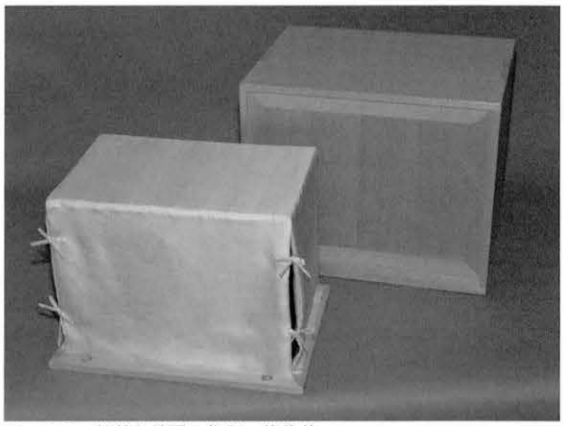


Fig. 6.23　桐箱と外覆の作製　修復後
Paulownia box and the outer cover, after restoration

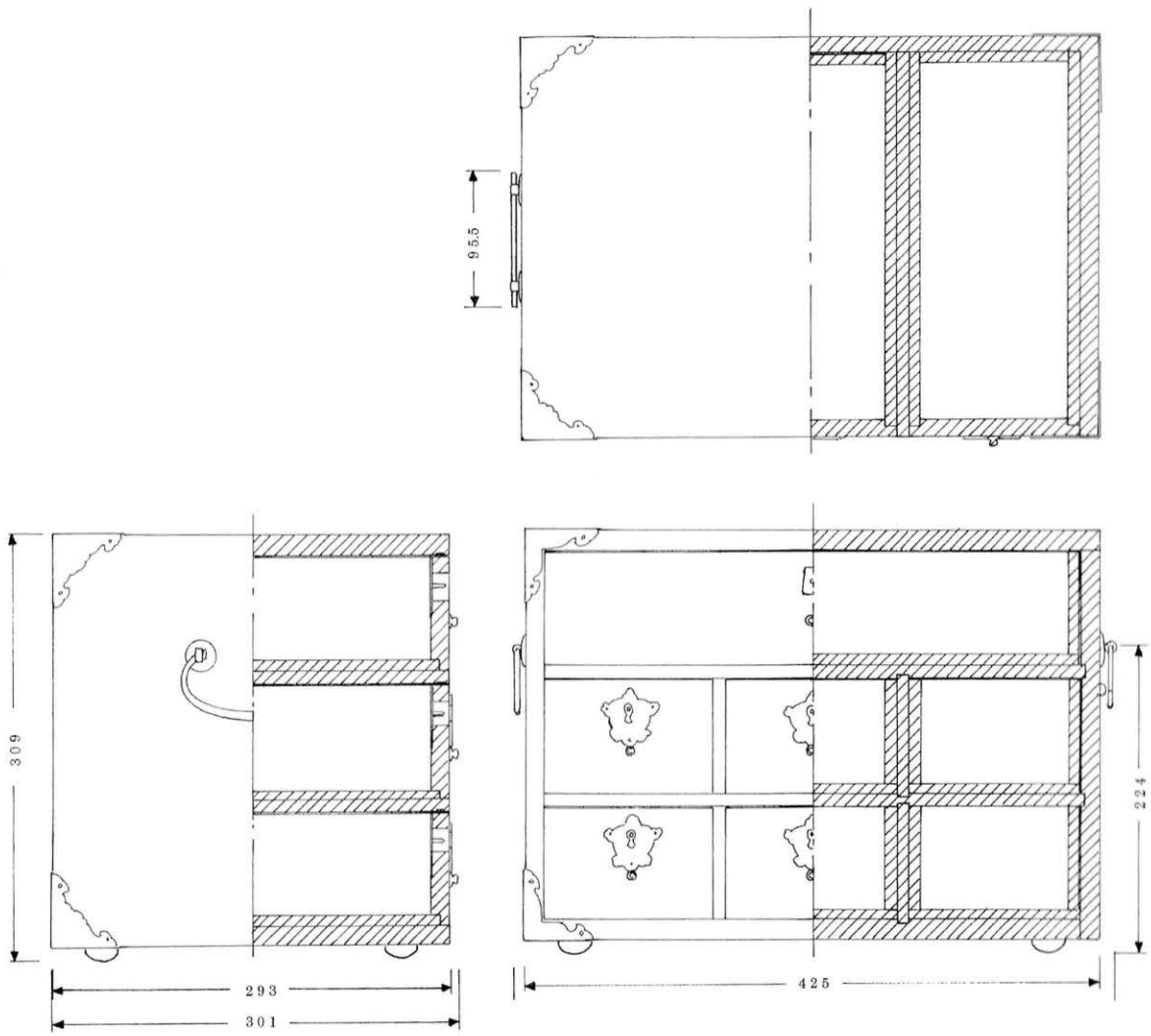


Fig. 6.24　花樹鳥蒔絵螺鈿箪笥　三面図
Trihedral figure of *Cabinet with Floral Design*

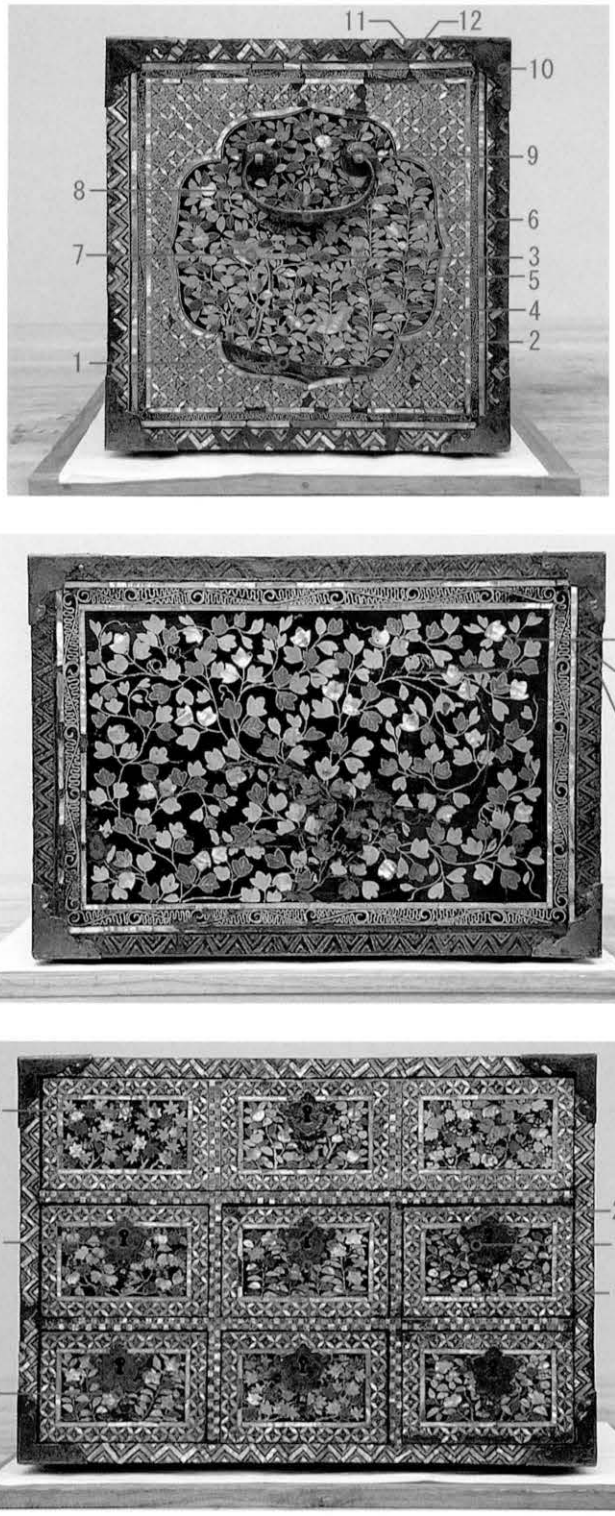


Fig. 6.25 螢光 X 線分析位置
Measuring points for X-ray fluorescence analysis

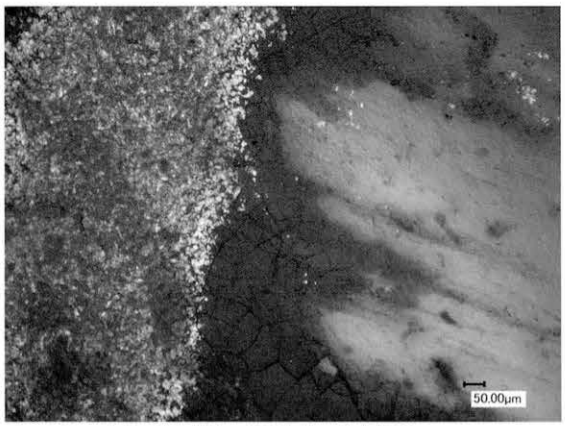


Fig. 6.26　上塗り漆と蒔絵・螺鈿加飾の拡大観察
Observation of the top coating of urushi and *makie* and *raden* decorations, enlarged

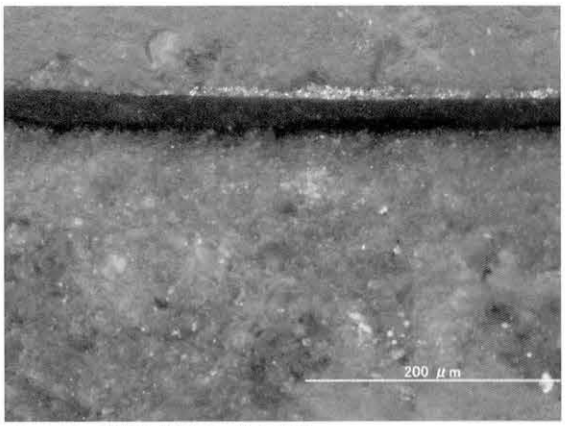


Fig. 6.27　蒔絵塗膜断面の拡大観察
Observation of the cross-section of *makie* coating film, enlarged

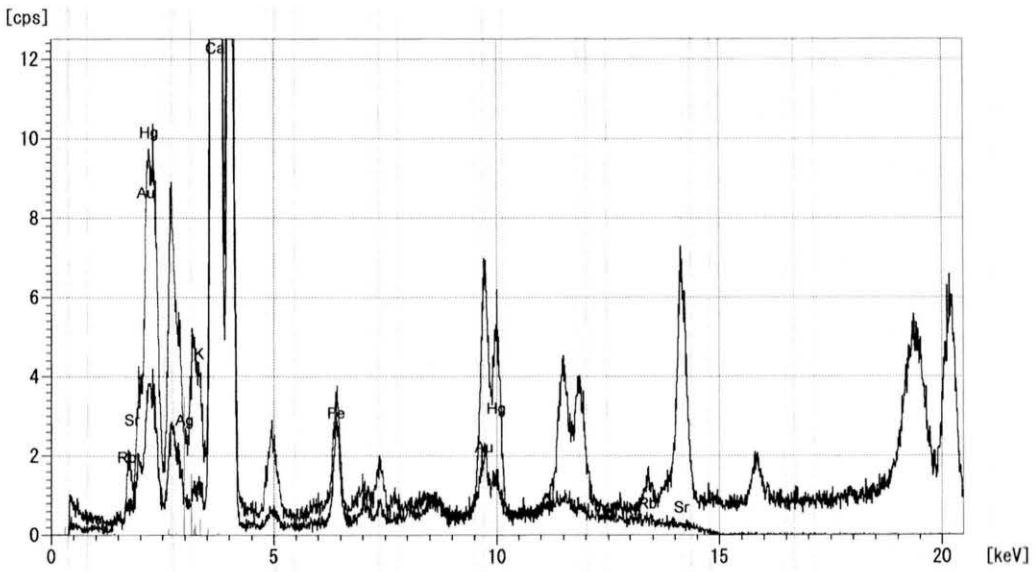


Fig. 6.28　蒔絵粉の蛍光X線分析結果
Result of X-ray fluorescence analysis of *makie* powder

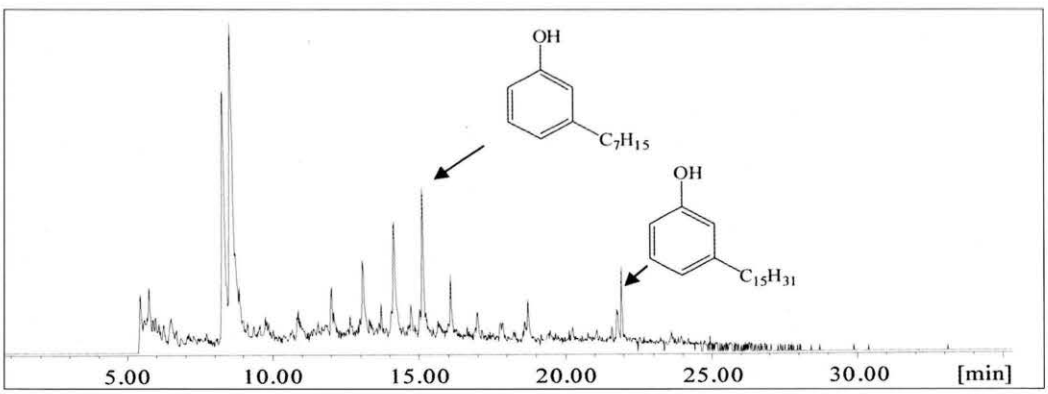


Fig. 6.29　塗膜破片試料の PY-GC/MS 分析結果
Result of PY-GC/MS analysis of a sample fragment of the coating film

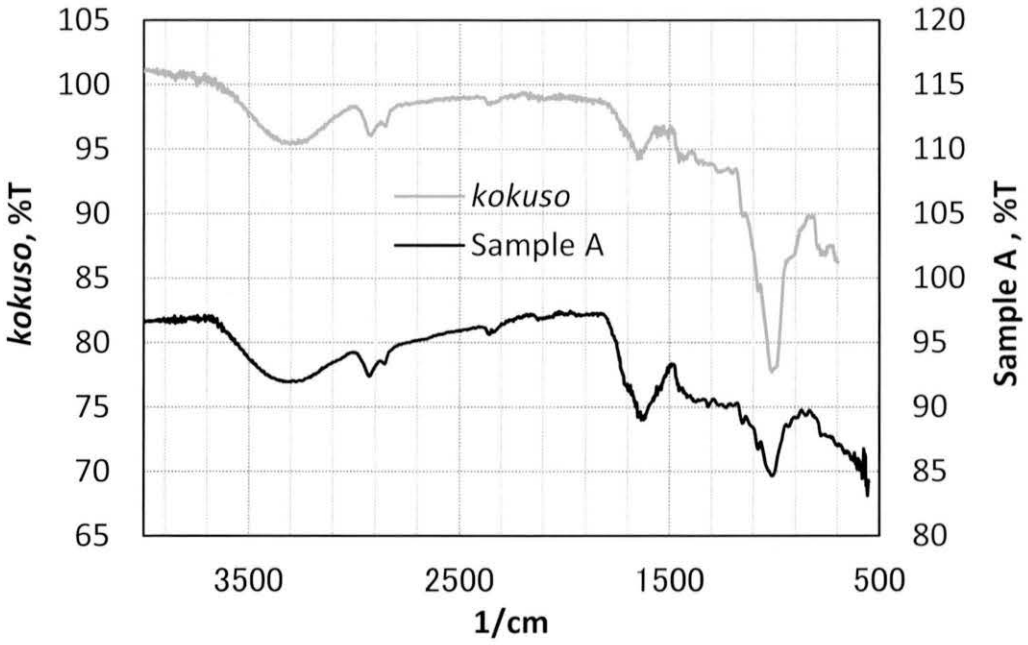


Fig. 6.30　赤外線スペクトル分析　試料 A
Fourier transform infrared spectroscopy, Sample A

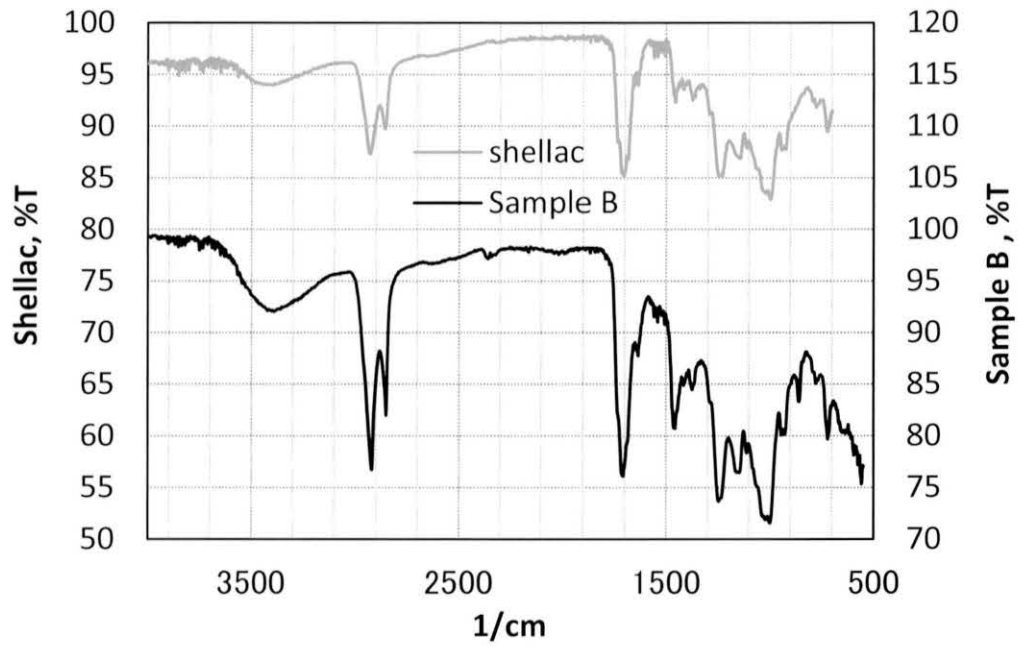


Fig. 6.31　赤外線スペクトル分析　試料 B
Fourier transform infrared spectroscopy, Sample B

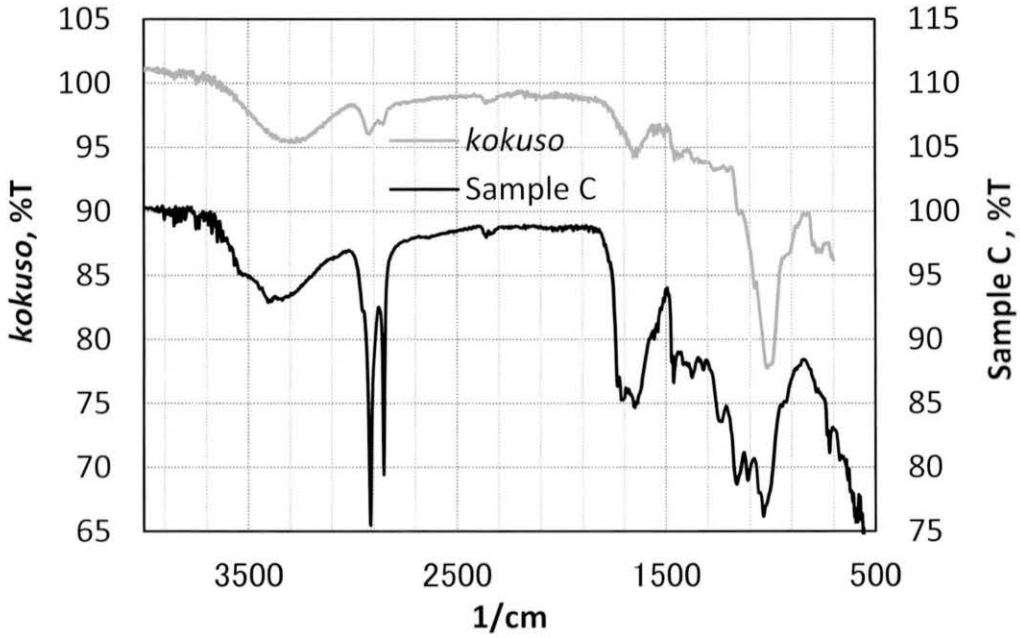


Fig. 6.32　赤外線スペクトル分析　試料 C
Fourier transform infrared spectroscopy, Sample C