

在外日本古美術品保存修復協力事業
The Cooperative Program for the Conservation of
Japanese Art Objects Overseas

二十五菩薩来迎図
*Twenty-Five Bodhisattvas
Descending from Heaven*

キンベル美術館（アメリカ合衆国）
絹本着色 掛幅装 2 幅

Kimbell Art Museum, United States of America
Color on silk, hanging scroll (two scrolls)

No.2012-1

平成 24 年度修復事業
The 2012 Japanese Fiscal Year

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1. 修復報告

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1.1. 名称等

名称	二十五菩薩来迎図
制作年代	室町時代（16 世紀）
所蔵者	キンベル美術館（アメリカ合衆国）
品質・形状	絹本着色 掛幅装（2 幅）

1.2. 工期及び施工者等

工期	平成 24 年 10 月 3 日～平成 25 年 11 月 15 日
施工場所	独立行政法人国立文化財機構 東京文化財研究所 修復アトリエ（紙）
保存修復担当者	東京文化財研究所 加藤雅人、楠京子、山田祐子 株式会社修護 君嶋隆幸、井上さやか

1.3. 修復前の状態（Table 1.1、Table1.3、Fig. 1.1 (a)、Fig. 1.2 (a)、Fig. 1.3 (a)、Fig. 1.4 (a)）

- ・経年によって本紙が硬化し、巻癖や強い折れが生じていた（Fig. 1.5 (a)）。
- ・折れの進行に伴う亀裂や本紙料絹および絵具の欠失が生じていた（Fig. 1.6 (a)）。
- ・料絹の欠失箇所からは、墨色の肌裏紙が露出していた（Fig. 1.7 (a)）。
- ・絵具、截金の剥離剥落が生じていた。特に緑色、青色などの粒子の粗い絵具や、白色絵具の厚塗り箇所に剥落が多かった（Fig. 1.8 (a)）。
- ・裏彩色の絵具が剥落していた。白色絵具で描かれた雲に顕著であった（Fig1.9 (a)）。
- ・本紙料絹と肌裏紙の間に糊浮きが生じていた。
- ・本紙および表装に経年による汚れがあった。
- ・軸首、端喰に緑青が生じていた。左軸左側の端喰の小口部分が欠失していた。
- ・3 幅納入用の保存箱に、2 幅のみが納入されていた。

1.4. 修復方針

原状保存、現状維持を基本方針として修復を行うこととした。

- ・全体に肌裏紙の糊浮きが生じていたことから、肌裏紙の取り替えを伴う修復を行うこととした。
- ・修復後の表装形式は、修復前と同様の仏表装（真の草）とすることとした。
- ・軸首、端喰は洗浄の上、再使用することとした。端喰の欠失箇所は復元することとした。
- ・必要に応じて随時材料分析を行うこととした。
- ・修復前の裏打ち紙、表装裂などの旧表装材料は全て別置保存とし、所蔵館へ返却することとした。

1.5. 修復工程

修復材料は Table1.5 を参照。

(1) 修復前調査（Fig. 1.10.1）

写真撮影を行い、修復前の損傷状況の調査と記録を行った（付録 1、2）。

(2) 埃の除去

刷毛を用いて本紙表面の埃を除去した。

(3) 解体・総裏紙除去 (Fig. 1.10.2)

上下軸、表装裂を取り外して掛軸装を解体した。本紙裏面にわずかな水分を与え、総裏紙を除去した。

(4) 水による洗浄 (Fig. 1.10.3)

イオン交換水を本紙表面から噴霧し、本紙の下に敷いた吸い取り紙に吸収させて水溶性の汚れを除去した。

* 本作品には絵具の剥落した箇所が多く見られたが、顕微鏡下での絵具の観察、水に濡れた時の絵具の接着力の確認の結果、これらの絵具は水による洗浄に耐えうると判断した。高い洗浄効果を期待して、剥落止めの前に洗浄を行った。

(5) 剥落止め (1 回目) (Fig. 1.10.4)

兎膠水溶液を用いて絵具の剥落止めを行った。

絵具部分を中心に、全体が適度に濡れるよう噴霧器を用いて兎膠水溶液 (2wt-%) を噴霧した。表面が乾き始めたことを確認し、ポリエステル紙と吸い取り紙と板で本紙を挟んで錘を乗せ、プレス乾燥させた。乾燥後、2wt-%と 1wt-%の兎膠水溶液をそれぞれ 1~2 回ずつ絵具部分に筆で塗布した。

* 兎膠水溶液を絵具層によく浸透させるために、水による洗浄後、本紙が乾く前の湿った状態で最初の剥落止めを行った。

(6) 本紙表面の保護 (Fig. 1.10.5)

室温で抽出したフノリ水溶液とレーヨン紙、楮紙を用いて本紙表面の保護を行った。

* 本作品には裏彩色の存在が確認されたため、肌裏紙の除去作業中に裏彩色を損なわないよう肌裏紙の繊維を解しながら小面積ずつ除去していく必要があった。そのため、一時的な表面の保護を施した。

(7) 肌裏紙除去 (Fig. 1.10.6)

小面積ずつ水分を与えて繊維を解しながら肌裏紙を除去した。

(8) 補絹 (Fig. 1.10.7)

電子線劣化絹を用いて本紙料絹の欠失箇所に補填を行った。

* 電子線劣化絹は、手織りの絵絹に 2300kGy (総量) の電子線を照射して物理強度を人工的に低下させたものを使用した (Fig. A.1.6)。

(9) 肌裏打ち (Fig. 1.10.8)

美濃紙と小麦デンプン糊を用いて肌裏打ちを行った。使用する美濃紙は、本紙の色調に合わせヤシャと木灰抽出液 (pH 10.5) で染色した。

(10) 剥落止め (2 回目)

粒子の粗い緑色と青色の絵具に 2wt-%の兎膠水溶液を筆で 1 回塗布し、その他の絵具には 1wt-%の兎膠水溶液を 1 回塗布した。

(11) 増裏打ち (Fig. 1.10.9)

美栖紙と古糊を用いて増裏打ちを行った。

* 本紙の裏打ちに使用する美栖紙の色を決定するため、美栖紙の色による本紙の色調の違いについて目視で観察し検討を行った。併せて、検討時の本紙の色調を分光測色計で記録した (付録 3)。

(12) 折れ伏せ入れ (Fig. 1.10.10)

本紙の折れ、亀裂箇所や将来折れを生じる可能性のある箇所に、美濃紙と新糊を用いて裏面から折れ伏せを施した。

(13) 表装裂地調整

新規表装裂を選び、加熱した炭酸カリウム水溶液（pH 10.5）による精錬を行った。ヤシヤおよびタンガラと木灰抽出液（pH 10.5）で色を調整し、美濃紙と小麦デンプン糊を用いて肌裏打ちを行った。さらに美栖紙と古糊を用いて増裏打ちを行った。

(14) 付け廻し（Fig. 1.10.11）

本紙と表装裂地を仏表装の形に付廻しした。

(15) 中裏打ち（Fig. 1.10.12）

美栖紙と古糊を用いて中裏打ちを行った。

(16) 総裏打ち（Fig. 1.10.13）

宇陀紙と古糊を用いて総裏打ちを行った。

(17) 仮張り

表張りし、十分に乾燥させた。

(18) 補彩（Fig. 1.10.14）

補絹を施した箇所、日本画用棒絵具、ガンボージを用いて本紙基調色の補彩を施した（Fig. A.1.6）。

(19) 調湿

仮張り板に裏張りした本紙を恒温恒湿室に入れ、高温多湿な環境から低温低湿な環境までを設定して2か月間の調湿を行った（付録4）。

* 伝統的には、表装後の寸法を安定させるために1〜3か月以上の十分な仮張り期間を設ける必要があるとされてきた。しかし、空調によって温度湿度変化が制御された環境下における長期間の仮張りの効果は期待できない。また、一般的に紙は数回の乾燥、湿潤を繰り返すことにより寸法安定性が向上することが知られている。そこで、より伝統的手法に近くかつ論理的にも寸法が安定すると考えられる本方法で調湿を行った。

(20) 仕上げ（Fig. 1.10.15）

下軸、八双、吊鐙、紐等を新調し掛軸装を仕立てた。軸首と端喰は、洗浄、欠失箇所の復元をして再使用した。

(21) 記録（Table 1.2、Table 1.4、Fig. 1.1 (b)、Fig. 1.2 (b)、Fig. 1.3 (b)、Fig. 1.4 (b)、Fig. 1.5 (b)、Fig. 1.6 (b)、Fig. 1.7 (b)、Fig. 1.8 (b)、Fig. 1.9 (b)）

修復後の写真撮影を行った。また、今回の修復に関する全ての記録をまとめた。

(22) 保存（Fig. 1.11.1、Fig. 1.11.2）

桐太巻添軸、2幅入り桐印籠蓋箱、正絹袷包裂、四方帙を新調し、作品を納入した。

1.6. 修復銘

下軸に以下の文を墨書した。

『絹本著色 二十五菩薩来迎図 二幅 キンベル美術館所蔵

平成二十五年（2013年）十一月修復了

独立行政法人国立文化財機構 東京文化財研究所による

平成二十四年度在外日本古美術品保存修復協力事業によって東京文化財研究所修復アトリエ（紙）に於いて施工 株式会社 修護』

1.7. 特記事項

修復前に使用されていた裏打ち紙、表装裂、保存箱等は別置保存とし、全て所蔵館に返却した。

1. Restoration Report

Kyoko Kusunoki*, Sayaka Inoue**, Yuko Yamada*,
Takayuki Kimishima**and Masato Kato*

* National Research Institute for Cultural Properties, Tokyo, **SHUGO Co., Ltd.

1.1. Artwork

Title	<i>Twenty-Five Bodhisattvas Descending from Heaven</i>
Period	16 th century, Muromachi era
Owner	Kimbell Art Museum, United States of America
Media and format	Color on silk, hanging scroll (two scrolls)

1.2. Duration, Place and People in Charge

Duration	3 October 2012 - 15 November 2013
Place	Restoration Studio (Paper), National Research Institute for Cultural Properties, Tokyo
People in charge	Masato Kato, Kyoko Kusunoki, Yuko Yamada (National Research Institute for Cultural Properties, Tokyo) Takayuki Kimishima, Sayaka Inoue (SHUGO Co., Ltd.)

1.3. Condition before Restoration (Table 1.1, Table 1.3, Fig. 1.1 (a), Fig. 1.2 (a), Fig. 1.3 (a), Fig. 1.4 (a))

- The artwork had become stiff with the passage of years; the artwork was curled because it had been rolled up for a long time. There were severe creases (Fig. 1.5 (a)).
- Cracks and losses of the silk for painting and paints had developed with the progress of creases (Fig. 1.6 (a)).
- Greyish first lining paper was exposed at places where the silk had been lost (Fig. 1.7 (a)).
- Paints and the gold *kirikane* (designs expressed by fine strips of gold leaf) had become lifted and lost. This was especially notable at places with paints made from green and blue coarse pigments or where there was a thick application of white (Fig. 1.8 (a)).
- A part of the verso painting (pigments applied to the verso of the silk) had been lost. This was especially severe on the clouds depicted in white (Fig. 1.9 (a)).
- The artwork had become separated from the first lining paper.
- The artwork and the mounting fabric had been dirty.
- Rust had developed on the roller knobs and the metal ornaments on the ends of the hanging rod. The part of metal ornament that covers the left cut end of the hanging rod of the left scroll was missing.
- Two scrolls were placed in a storage box for three scrolls.

1.4. Restoration Policy

Restoration of the artwork to its status quo ante and the maintenance of the present condition were to be the fundamental policy to be followed in restoring the artwork.

- Since the artwork had become separated from the first lining paper, it was decided to restore the artwork including replacement of the first lining paper.

- It was decided to mount the artwork in the Buddhist mounting style with a central border, outer border and narrow strips of lined fabric, the same style as before restoration.
- It was decided to clean and reuse the roller knobs and to reproduce the missing part of the metal ornament on the end of the hanging rod.
- It was decided that materials would be analyzed whenever necessary.
- It was decided that old mounting materials, such as lining paper and mounting fabrics, would be stored separately from artwork and returned to the museum.

1.5. Restoration Process

Regarding restoration materials, see Table 1.5.

(1) Investigating before restoration (Fig. 1.10.1)

Photographs were taken and the condition of damage before restoration was examined and documented (Appendix 1, Appendix 2).

(2) Removing dust

A brush was used to remove dust from the surface of the artwork.

(3) Disassembling and removing the final lining paper (Fig. 1.10.2)

The hanging and rolling rods as well as the mounting fabrics were removed. The artwork was slightly moistened from the back side to remove the final lining paper.

(4) Washing with water (Fig. 1.10.3)

In order to remove water-soluble dirt, deionized water was sprayed onto the front side of the artwork and absorbed by blotting paper placed under the artwork.

* From the results of observation of the paints under a microscope and a test of the adhesive force of the animal glue when moistened, it was confirmed that the artwork would be able to withstand washing with water.

(5) Consolidation (the first time) (Fig. 1.10.4)

Aqueous rabbit glue solutions were used to consolidate the paints.

A spray was used to apply the aqueous rabbit glue solution (2 wt-%) so that the entire artwork would become appropriately moist, focusing mainly on the painted parts. When the surface had started to dry, the artwork was sandwiched between sheets of polyester paper, then blotting paper and finally a wooden board for press-drying. Once the artwork had dried, 2 wt-% and 1 wt-% aqueous rabbit glue solutions were applied to the painted parts with a brush once or twice respectively.

* In order to make the aqueous rabbit glue solutions permeate well into the paint layers, the first application of the solutions was executed to the wet artwork just after washing with water.

(6) Facing on the recto (Fig. 1.10.5)

The artwork was faced with rayon paper and *kozo* paper using an aqueous extraction of seaweed paste at room temperature.

* Since verso painting had been found on this artwork, it was necessary to apply protection from the recto.

(7) Removing the previous first lining paper (Fig. 1.10.6)

The first lining paper was removed by applying moisture to pick the fibers of paper, progressing

gradually in small areas.

(8) Infilling silk (Fig. 1.10.7)

Artificially deteriorated silk was used to fill in the missing parts of the artwork. Artificially deteriorated silk was obtained by irradiating 2300 kGy (total amount) of electron beams onto silk for painting in order to decrease its physical strength (Fig. A.1.6).

(9) First lining (Fig. 1.10.8)

Mino paper was dyed with *yasha* by adjusting pH to 10.5 with an extraction of Japanese oak ash in order to match the color tone of the artwork. The *mino* paper was pasted to the artwork with wheat starch paste.

(10) Consolidation (the second time)

A 2 wt-% aqueous rabbit glue solution was applied once with a brush to the green and blue paints, a 1 wt-% aqueous rabbit glue solution was applied once to the other colors.

(11) Second lining (Fig. 1.10.9)

Misu paper was pasted with aged starch paste.

* In order to determine the color of the *misu* paper to be used for the lining of the artwork, the influence of *misu* paper on the tone of the artwork was checked by visual observation and analysis of spectra (Appendix 3).

(12) Reinforcement (Fig. 1.10.10)

Using wheat starch paste, reinforcement paper strips, which was made of *mino* paper, were applied to creases and cracks on the artwork from the backside as well as to places where creases might occur in the future.

(13) Preparing the mounting fabrics

New fabrics for mounting were selected, degummed with heated aqueous solution of potassium carbonate and dyed with *yasha*, *tangara* using an extraction of Japanese oak ash to adjust the pH to 10.5. Then the first lining, *mino* paper, was applied using wheat starch paste. The second lining, *misu* paper, was applied using aged starch paste.

(14) Assembling (Fig. 1.10.11)

The artwork and the mounting fabrics were assembled in a Buddhist mounting style.

(15) Third lining (Fig. 1.10.12)

Misu paper was applied with aged starch paste.

(16) Final lining (Fig. 1.10.13)

Uda paper was applied with aged starch paste.

(17) Drying

The artwork was sufficiently dried with restraint face up on a drying board.

(18) Inpainting (Fig. 1.10.14)

Inpainting was applied to parts that had been infilled, using stick type paints for Japanese painting and gamboge so as to match the color of the infilled parts with that of the artwork (Fig. A.1.6).

(19) Conditioning

The artwork, on the drying board with restraint, was kept for 2 months in an environmental control chamber that had been set as shown in Appendix 4.

*Traditionally, it has been said that sufficient period of time from 1 to 3 months or more is necessary after all the lining had been applied to ensure dimensional stability. However, in an environment that is controlled by air-conditioning, as is common now, the effect of a long duration of conditioning is not expected. Moreover, it is known that the dimensional stability of paper improves with repeated drying and humidifying. Thus, this method of conditioning, which is close to the traditional method and theoretically considered to improve the stability of the dimensions, was taken.

(20) Finishing (Fig. 1.10.15)

The roller rod, hanging rod, ring tacks, wrapping cord and hanging cord were made new and the artwork was finished in a hanging scroll format. Roller knobs and metal ornaments were cleaned and reused, their missing parts having been reproduced.

(21) Documentation (Table 1.2, Table 1.4, Fig. 1.1 (b), Fig. 1.2 (b), Fig. 1.3 (b), Fig. 1.4 (b), Fig. 1.5 (b), Fig. 1.6 (b), Fig. 1.7 (b), Fig. 1.8 (b), Fig. 1.9 (b))

Photographs were taken after restoration. In addition, all records relating to this restoration work was compiled.

(22) Storing the artwork (Fig. 1.11.1, Fig. 1.11.2)

Paulownia roller clamps, apaulownia *inro*-style box for two scrolls, an outer case and silk wrapping cloth folded in two and sewn in a French-seam style were made.

1.6. Inscription regarding Restoration

The following inscription was made in ink on the roller rod.

『絹本著色 二十五菩薩来迎図 二幅 キンベル美術館所蔵

平成二十五年（2013年）十一月修復了

独立行政法人国立文化財機構 東京文化財研究所による

平成二十四年度在外日本古美術品保存修復協力事業によって東京文化財研究所修復 アトリエ（紙）に於いて施工 株式会社 修護』

(English translation of the inscription)

Twenty-Five Bodhisattvas Descending from Heaven,

ink on silk, two scrolls

Collection of the Kimbell Art Museum

Restoration completed in November 2013

National Research Institute for Cultural Properties, Tokyo, National Institutes for Cultural Heritage

The project of the Cooperative Program for the Conservation of Japanese Art Objects Overseas, 2012

Restoration Studio (Paper) of the National Research Institute for Cultural Properties, Tokyo
SHUGO Co., Ltd.

1.7 Note

The previous mounting materials, such as lining paper, mounting fabrics and storage box were preserved separately and returned to the museum.

Table 1.1 寸法 修復前
Dimensions, before restoration

	縦 Height (cm)	横 Width (cm)
本紙 右幅 (向かって右側) Artwork, right scroll (from the viewer's perspective)	99.0	40.0
全体 右幅 Artwork with mounting, right scroll	164.3	55.6
本紙 左幅 (向かって左側) Artwork, left scroll (from the viewer's perspective)	99.1	40.0
全体 左幅 Artwork with mounting, left scroll	164.3	55.6

Table 1.2 寸法 修復後
Dimensions, after restoration

	縦 Height (cm)	横 Width (cm)
本紙 右幅 Artwork, right scroll	99.3	40.4
全体 右幅 Artwork with mounting, right scroll	175.5	56.0
本紙 左幅 Artwork, left scroll	99.3	40.4
全体 左幅 Artwork with mounting, left scroll	175.5	56.6

Table 1.3 形式・仕様等 修復前
Format and mounting materials, before restoration

形式	掛軸装（仏表装）
Format	Hanging scroll (Buddhist-style)
中縁、風帯	濃茶地蓮華唐草文金襴
Central border fabric, Decorative fabric strips	<i>Kinran</i> (gold brocade) with a lotus arabesque motif on a dark brown background
総縁	茶地雲文綾
Outer border fabric	<i>Aya</i> (twill) with a cloud motif on a brown background
軸首・端喰	菊唐草文金鍍金軸
Roller knobs	Gold gilded roller knobs with a chrysanthemum arabesque motif
啄木	萌黄地真田紐
Cord	Light green braided cord
肌裏紙	楮紙
First lining	<i>Kozo</i> paper
増裏紙	楮紙
Second lining	<i>Kozo</i> paper
中裏紙	—
Third lining	—
総裏紙	楮紙
Final lining	<i>Kozo</i> paper
折伏せ	楮紙
Reinforcement paper strips	<i>Kozo</i> paper
補修絹	—
Infill silk	—
太巻添軸	—
Roller clamp	—
包裂	羽二重包裂
Wrapping cloth	Finely-woven <i>habutae</i> silk
四方帙	—
Outer case	—

Table 1.4 形式・仕様等 修復後
Format and mounting materials, after restoration

形式	掛軸装（仏表装）
Format	Hanging scroll (Buddhist-style)
中縁、風帯	紫地一重蔓中牡丹唐草文金襴（廣信織物）
Central border fabric, Decorative fabric strips	<i>Kinran</i> (gold brocade) with an arabesque and medium sized peony with single vine motifs on a purple background (made by Hironobu Orimono)
総縁	茶地雲文綾
Outer border fabric	<i>Aya</i> (twill) with a cloud motif on a brown background
軸首・端喰	（再使用）
Roller knobs	（reused）
啄木	白茶地啄木正絹紐
Cord	White-brown silk cord
太巻添軸	桐太巻添軸（小早川桐箱製作所）
Roller clamp	<i>Paulownia</i> (<i>Paulownia tomentosa</i>) roller clamp (made by Kobayakawa Kiribako Seisakujo)
包裂	正絹衿包裂（速水商店）
Wrapping cloth	Lined silk wrapping cloth (purchased through Hayamizu Shoten)
保存箱	2 幅入り 桐印籠蓋箱（小早川桐箱製作所）
Storage box	<i>Paulownia inro</i> -style box for 2 scrolls (made by Kobayakawa Kiribako Seisakujo)
四方帙	藍裂四方帙（小早川桐箱製作所）
Outer case	Paper covered with indigo blue fabric (made by Kobayakawa Kiribako Seisakujo)

Table 1.5 修復材料
Restoration materials

水 Water	イオン交換水 Deionized water
糊 Paste	小麦デンプン（草野食品） Wheat starch paste (manufactured by Kusano Shokuhin) 古糊（文化財保存） Aged starch paste (made by Bunkazaihozon)
膠 Animal glue	兔膠（ニューヨークセントラルアートサプライ） Rabbit glue (manufactured by New York Central Art Supply)
フノリ Seaweed paste	マフノリ、フクロフノリ、ハナフノリ（久平、大脇萬蔵商店） <i>Mafunori (Gloiopeltis tenax)</i> , <i>Fukurofunori (Gloiopeltis furcata)</i> , <i>Hanafunori (Gloiopeltis complanata)</i> (Kyuhei, made by Owaki Manzo Shoten)
肌裏紙 First lining	楮紙（美濃紙、長谷川聡） <i>Kozo paper (mino paper, made by Satoshi Hasegawa)</i>
増裏紙 Second lining	楮紙（美栖紙、上窪正一） <i>Kozo paper (misu paper, made by Shoichi Uekubo)</i>
中裏紙 Third lining	楮紙（美栖紙、上窪正一） <i>Kozo paper (misu paper, made by Shoichi Uekubo)</i>
総裏紙 Final lining	楮紙（宇陀紙、福西宏行） <i>Kozo paper (uda paper, made by Hiroyuki Fukunishi)</i>
折伏せ Reinforcement paper strips	楮紙（美濃紙、長谷川聡） <i>Kozo paper (mino paper, made by Satoshi Hasegawa)</i>
補修絹 Infill silk	絵絹（廣信織物）独立行政法人日本原子力研究開発機構高崎量子応用研究所にて電子線を照射 Painting silk (made by Hironobu Orimono) irradiated at Takasaki Advanced Radiation Research Institute, Japan Atomic Energy Agency 経 21 中 65 枚 2 ツ入り 緯 21 中×2 本抜 100 横 Wrap: 21 denier 50 double-strands per 3.03 cm Weft: 14 denier 60 double-strands per 3.03 cm
染料 Dye	ヤシャ（田中直染料店）、タンガラ（田中直染料店） <i>Yasha (Alnus firma)</i> (purchased through Tanakanao Senryoten), <i>tangara (Bruguiera conjugate, Merr.)</i> (purchased through Tanakanao Senryoten)
媒染剤 Mordant	木（カシ、ナラ）灰（田中直染料店） Japanese oak ash (purchased through Tanaka Nao Senryoten)
補彩絵具 Inpainting paints	ガンボーシ（放光堂）、日本画用棒絵具（藍棒・洋紅棒・代赭棒、放光堂） Gamboge (purchased through Hokodo), stick type paints for Japanese painting (synthetic indigo, red and yellowish brown, purchased through Hokodo)



(a)



(b)

Fig. 1.1 全体 右幅 (a) 修復前 (b) 修復後

Artwork with mounting, right scroll (a) before restoration (b) after restoration



(a)



(b)

Fig. 1.2 全体 左幅 (a) 修復前 (b) 修復後

Artwork with mounting, left scroll (a) before restoration (b) after restoration



(a)



(b)

Fig. 1.3 本紙 右幅 (a) 修復前 斜光線写真 (b) 修復後
Artwork, right scroll (a) before restoration, photograph with raking light (b) after restoration



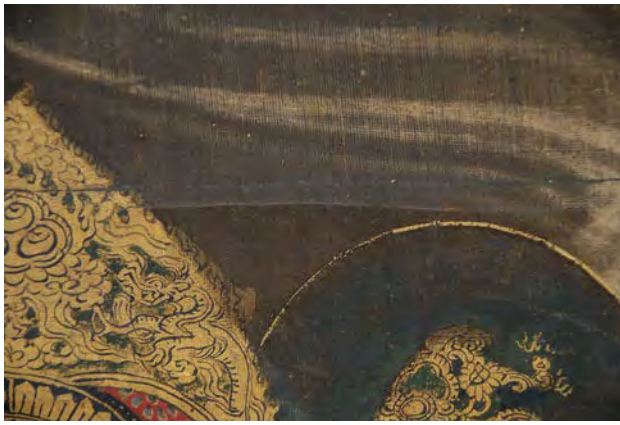
(a)



(b)

Fig. 1.4 本紙 左幅 (a) 修復前 斜光線写真 (b) 修復後

Artwork, left scroll (a) before restoration, photograph with raking light (b) after restoration



(a)



(b)

Fig. 1.5 折れ (a) 修復前 (b) 修復後

Creases (a) before restoration (b) after restoration



(a)



(b)

Fig. 1.6 亀裂 (a) 修復前 (b) 修復後

Cracks (a) before restoration (b) after restoration



(a)



(b)

Fig. 1.7 肌裏紙の露出 (a) 修復前 (b) 修復後

Exposed first lining paper (a) before restoration (b) after restoration



(a)



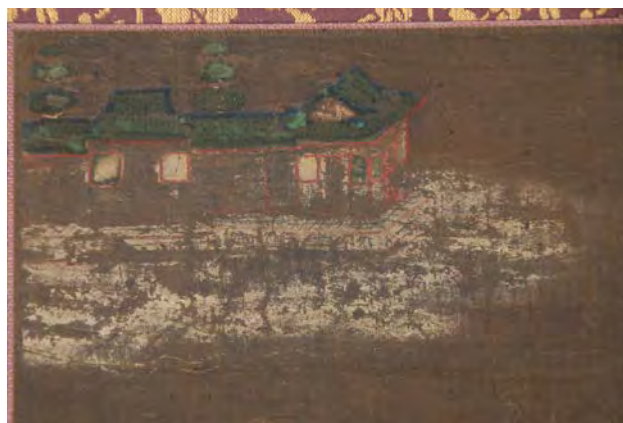
(b)

Fig. 1.8 絵具の剥離剥落 (a) 修復前 (b) 修復後

Lifted and missing paints (a) before restoration (b) after restoration



(a)



(b)

Fig. 1.9 裏彩色の剥落 (a) 修復前 (b) 修復後

Missing paints on verso painting (a) before restoration (b) after restoration



Fig. 1.10.1 修復前調査
Investigating before restoration



Fig. 1.10.2 解体・総裏紙除去
Disassembling and removing the
final lining paper



Fig. 1.10.3 水による洗浄
Cleaning with water



Fig. 1.10.4 剥落止め
Consolidation



Fig. 1.10.5 表打ち
Facing



Fig. 1.10.6 肌裏紙除去
Removing the first lining paper



Fig. 1.10.7 補絹
Infilling



Fig. 1.10.8 肌裏打ち
Applying the first lining



Fig. 1.10.9 増裏打ち
Applying the second lining



Fig. 1.10.10 折れ伏せ入れ
Reinforcement



Fig. 1.10.11 付け廻し
Assembling



Fig. 1.10.12 中裏打ち
Applying the third lining



Fig. 1.10.13 総裏打ち
Applying the final lining



Fig. 1.10.14 補彩
Inpainting



Fig. 1.10.15 仕上げ
Finishing



Fig. 1.11.1 保存箱（修復前）
Storage box (before restoration)

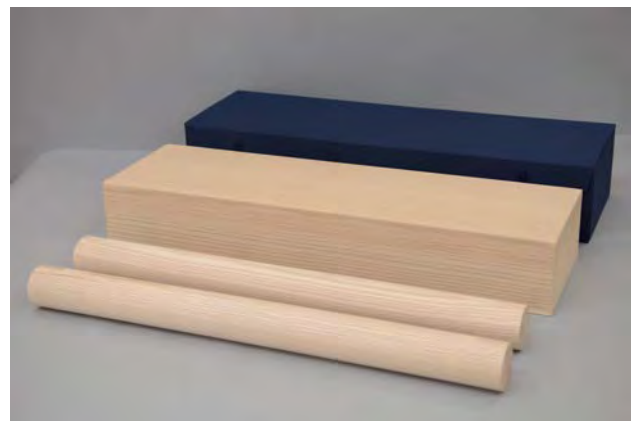


Fig. 1.11.2 保存箱等（新調）
Storage box and related items (newly made)

本報告の内容の一部は学会で発表した。

楠京子、山田祐子、加藤雅人、君嶋隆幸、井上さやか「キンベル美術館所蔵『二十五菩薩来迎図』修復事例報告」文化財保存修復学会第 37 回大会 要旨集 pp.274-275 (2015)

Parts of this report were presented at the following annual meeting.

「キンベル美術館所蔵『二十五菩薩来迎図』修復事例報告」

Kyoko Kusunoki, Yuko Yamada, Masato Kato, Takayuki Kimishima, Sayaka Inoue.

The 37th Annual meeting of The Japan Society for the Conservation of Cultural Property,
Abstracts in Japanese, pp. 274-275 (2015).

2. 作品解説

東京文化財研究所

小林 達郎

往生者を極楽に迎える阿弥陀如来に従う二十五菩薩を描いた、浄土教信仰に基づく作品である。

二幅の掛幅装。目のつんだ画絹各一副一鋪。右幅下方に往生者を乗せるための蓮台を捧げ持つ観音菩薩、左幅下方に合掌する勢至菩薩が見え、これを先頭として、来迎する二十五菩薩が描かれる。

修理前の箱は、三幅一具の一合で、蓋表に墨書があり、「聖衆来迎絵／左 恵心僧都／中 林丘寺宮／右 恵心僧都」とある。平安時代の天台僧で浄土教思想家として著名な恵心僧都源信（942-1017）は、ことに近世以後、浄土教美術作品の制作者として充てられることが多いが、歴史的根拠に基づくものではない。中幅の筆者と書かれる「林丘寺宮」は後水尾天皇の皇女、光子内親王（1634～1727）のことで、絵をよくしたことが知られる。中尊としての阿弥陀如来像が描かれていたであろうこの中幅はすでに失われており、筆者についての当否は現在ではうかがえない。ただし、この箱書から推測すれば、中幅は、現存するこの左右の二十五菩薩と画風を異にしていたこと、したがって、江戸初期の時点で、この二幅のみの状態であったものの、これ以降、阿弥陀如来を描いた中幅が加えられたものであったと考えられる。来迎図においては、二十五菩薩のみが伝存する例も複数あり、すべてに中尊が必ず存在するわけではない。しかし本図の場合、両幅の画面上部、互いの境界寄りに雲に乗った宮殿が描かれている。これは九品来迎図のうち上品上生図に描かれることの多かった七宝宮殿の翼廊であろうから、これをつなぐ中央の楼閣を描いた幅が存在したはずであり、これとともに中尊としての阿弥陀如来を描いた中幅が当初は存在した可能性が大きいと考えられる。本来は「阿弥陀二十五菩薩来迎図」と称すべきものであったろう。

七宝宮殿のある二十五菩薩を伴う阿弥陀来迎を描いた上品上生図は、『観無量寿経』に基づくが、これをもって来迎図の典型としたのは、鎌倉期に始まった浄土宗、中でも証空（1177-1247）の影響が大きく、以後多く流布した。

本図は右幅に十三菩薩、左幅に十二菩薩（それぞれ一比丘形を含む）をすべて立像で、舞い、あるいは楽器を奏でる菩薩の姿態を大きくなく整然と描き、阿弥陀来迎図にしばしばみられる背景の山水や化仏などはない。現存する阿弥陀二十五菩薩の図様は多様で、鎌倉時代に様々な展開があったことがわかるが、その点では本図はかなり整理された段階のものといえる。

菩薩は比丘形の白い肉身を除いて、すべて金泥を一樣に塗った、鎌倉時代以降に現れる皆金色で表される。着衣には金箔を切った截金で、格子文、麻葉文、卍繋ぎ文、華文など多くの種類の文様を表し、截金も繊細である。

修理中の裏面の観察によって知られたところでは、下描き線はのびのびとして渋滞がなく、筆者が優れた絵仏師であったことがうかがえる。赤外線画像によって、図様はもとより、輪郭線の変更もほとんどなされていないことが知られた。また各所に絹の裏から絵具を塗って色彩の色合いをやわらかくする裏彩色が確認された。これは、本図が平安時代以来の伝統的技法に乗っ取った本格的な作品であることを表す。菩薩の金色地の部分は白色で裏から彩色し、表から橙色を塗って下地としている。この橙色からは鉛が検出され、丹であったことが分かる。金の下地に丹を塗ることは、伝統的な仏画にしばしば見られる技法で、金の発色を美しくする効果がある。裏彩色は、ほかにも菩薩の頭光に白緑、蓮台に緑、幡蓋や、楽器を乗せる台に掛けられた辱布に朱、などが確認できた。

表面から見られる、楽器を乗せる台の朱地に描かれた色彩による文様の表現も正確で各色を交えて繊細で

ある。頭光も一色でなく、菩薩の頭に近いところは外に向かってぼかした緑青で彩色したのち、群青で彩色し、顔料も良質であることなど、優れた色彩感覚が修理のクリーニング効果によってよりよく見ることができるようになった。

やや華奢なおもむきをもつ菩薩の描写は、鎌倉時代後期の来迎図である小童寺本（重文）や雲辺寺本（重文）に通ずるものがある。本図はこれよりはやや下る 14 世紀、鎌倉時代末期頃の制作と考えられよう。鎌倉時代初頭以降の浄土教信仰の隆盛に伴って数多く作られ、日本の仏教絵画史上、重要な位置をしめる阿弥陀来迎図の本格的な作例のひとつとして、貴重である。

2. Description of the Artwork

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National Research Institute for Cultural Properties, Tokyo

Twenty-Five Bodhisattvas Descending from Heaven is a painting based on the teachings of the Pure Land (Jodo). Twenty-five bodhisattvas that accompany Amida-nyorai (Amitabha) are depicted.

A pair of hanging scrolls. Densely woven silk with no seam. On the lower part of the right scroll stands Kan'on-bosatsu (Avalokitesvara) holding a lotus pedestal on which a person being led to Pure Land is to be seated; on the lower part of the left scroll is Seishi-bosatsu (Mahasthamaprapta) with hands in prayer. With these two bodhisattvas at the head of each scroll, altogether the twenty-five bodhisattvas are depicted on the two scrolls.

The box that contained the scrolls before restoration was made for three scrolls with an inscription in ink on the top of the lid: 「聖衆来迎絵／左 恵心僧都／中 林丘寺宮／右 恵心僧都」 “Paintings of the descent of heavenly hosts: (left) Eshin-sozu, (middle) Rinkyujinomiya, (right) Eshin-sozu”. Although Eshin-sozu (Genshin) (942-1017), a priest of the Tendai sect in the Heian era who was well known since the early modern period as a philosopher of the Pure Land teachings, was often said to have been a producer of works of art of the Pure Land teachings, it is not based on historical evidence. ‘Rinkyujinomiya’, said to be the painter of the middle scroll, is Princess Mitsuko (1634-1727), daughter of Emperor Gomizuno-o, who is known to have had a talent for painting. This middle scroll, on which the Amida-nyorai image is thought to have been depicted as a middle image, has been lost and it is not possible now to identify the painter. However, based on this inscription on the box, it is possible to assume that the style of the middle scroll was different from that of the twenty-five bodhisattvas depicted on the left and right scrolls and that for this reason there were only two scrolls in the early Edo era and that the middle scroll depicting Amida-nyorai was added later. Among paintings depicting the descent of Amida-nyorai there are some in which only the twenty-five bodhisattvas are depicted; the middle image does not necessarily exist. However, in the case of this work a palace on a cloud is found on the upper part of each scroll and to the side of the respective scroll closer to the center. Since the images of the palace are assumed to be the wings of the heavenly palace which was frequently depicted on the Jobon-josho (upper superior) of the nine grades of the descent of Amida-nyorai, it is most probable that there was a middle scroll which depicted the main multi-storied building that joined the wings to the left and right and that at first there was a middle scroll that depicted Amida-nyorai as the middle image. Thus, those three scrolls should have been referred to as the ‘Descent of Amida and Twenty-five Bodhisattvas’.

The image of Jobon-josho depicting the descent of Amida-nyorai with the twenty-five bodhisattvas from the heavenly palace is based on ‘Amitayurdhyana Sutra’, but it was among the Jodo sect, which had its beginnings in the Kamakura era (1185-1333), that Jobon-josho became a model of paintings depicting a descent. Particularly, the influence of Shoku (1177-1247) was great

and many such paintings followed suit.

In this work, there are thirteen bodhisattvas on the right scroll and twelve on the left scroll (including a priest in each) all depicted in a standing position either dancing or playing a musical instrument, neither too big nor too small, in an orderly manner. Landscapes and *kebutsu* (Buddha in manifestation) often seen in paintings of the descent of Amida-nyorai are not found. The various designs of the twenty-five bodhisattvas of Amida-nyorai that exist today suggest that there was a number of development in type but this particular work appears to be one that was made at a stage when the development had become stable.

The bodhisattvas are, with the exception of the white body of the priest in each scroll, are all depicted in gold, in a style that appeared after the Kamakura era, using gold pigment. The patterns on the clothing are various – lattices, hemp leaves, consecutive fylfots, flowers and others. They are all executed in extremely delicate *kirikane* technique using gold leaf cut into various shapes.

Observation of the verso of the work during restoration revealed that the lines of the under-drawing are quite smooth and relaxed, suggesting that they are the work of an outstanding artist. Infrared image showed that the design and the outlines had undergone almost no change. Verso painting, in which paint is applied to the back of the silk in order to soften the color tone, was also found at many places, showing that this is a work created with traditional techniques that existed since the Heian era. White was applied to the back and orange to the front for the ground color of the gold of the bodhisattvas. Since lead was detected from this orange color, it is clear that *tan* (red lead) was used. Using *tan* as a ground for gold is a technique frequently found in traditional Buddhist paintings; it helps to produce a beautiful gold color. Other examples of verso painting were also confirmed: *byakuroku* (pale green) for the head nimbus of the bodhisattvas, green for the lotus pedestal, and vermilion for the canopy and the cloth covering the stands for musical instruments.

The colors of patterns depicted on the vermilion stands for musical instruments are also varied and their expression is very accurate and delicate. The head nimbuses are also not in a single color; *rokusho* (green pigment obtained from malachite) is used in gradation going outward, and *gunjo* (azurite) is added. The pigments are all of high quality. Cleaning in the process of restoration has shown an outstanding sense of color.

The somewhat fragile depiction of the bodhisattvas is similar to the one seen in such late Kamakura era paintings of the descent of Amida-nyorai as that at Shodo-ji temple and Umpen-ji temple, both important cultural properties. This particular work is considered to have been made a little later, toward the end of the Kamakura era, in the 14th century. It is a valuable work, one of the examples of paintings depicting the descent of Amida-nyorai that were produced with the increasing popularity of the belief in the teachings of Pure Land after the beginning of the Kamakura era and that have an important role in the history of Buddhist paintings of Japan.

付録 Appendices

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Kyoko Kusunoki, Yuko Yamada, Akira Fujisawa, Masato Kato
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付録 1. 記録

Appendix 1. Documentation



■	； 欠失	Losses
■	； 折れ	Creases
■	； 過去の折れ痕	Traces of creases from the past
■	； 汚れ・付着物	Dirt and accretions
■	； 浮き	Separation of silk from the first lining

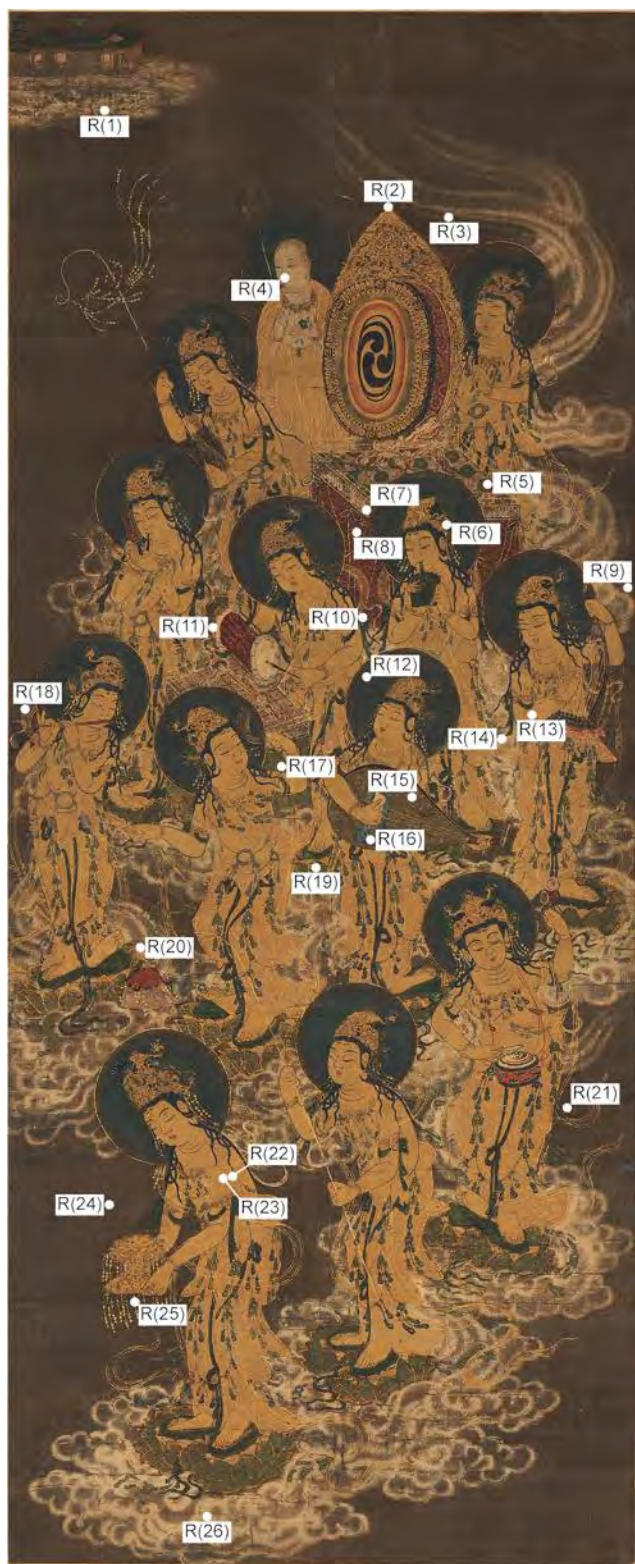
Fig. A.1.1 修復前損傷図面（右幅）

Mapping of damages before restoration (right scroll)



■	； 欠失	Losses
■	； 折れ	Creases
■	； 過去の折れ痕	Traces of creases from the past
■	； 汚れ・付着物	Dirt and accretions
■	； 浮き	Separation of silk from the first lining

Fig. A.1.2 修復前損傷図面（左幅）
Mapping of damages before restoration (left scroll)



(a)



(b)

Fig. A.1.3 顕微鏡写真撮影箇所 右幅 (a) 表面 (b) 裏面

The points that micrographs were taken, right scroll (a) front side (b) back side

使用機器	デジタルマイクロスコープ Dino-Lite PRO (ANMO Electronics)
ピクセル数	640×480
画像フォーマット	JPEG
Apparatus	Digital Microscope Dino-lite PRO, ANMO Electronics
Image size	640×480
Image format	JPEG

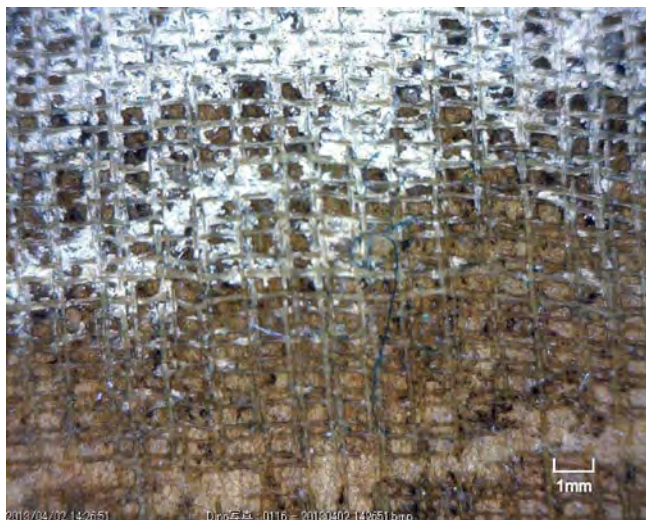


Fig. A.1.3.1 顕微鏡写真 R(1)
Micrographs R(1)

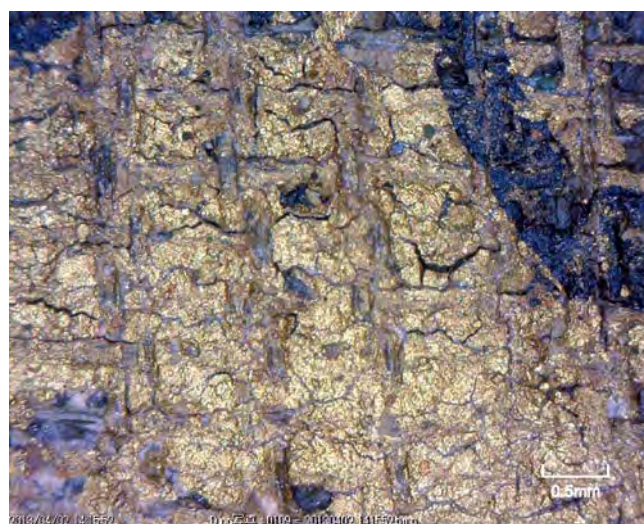
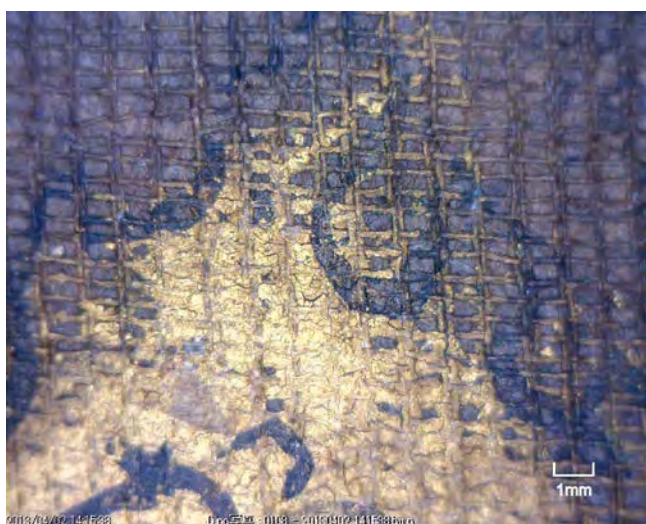


Fig. A.1.3.2 顕微鏡写真 R(2)
Micrographs R(2)



Fig. A.1.3.3 顕微鏡写真 R(3)
Micrographs R(3)

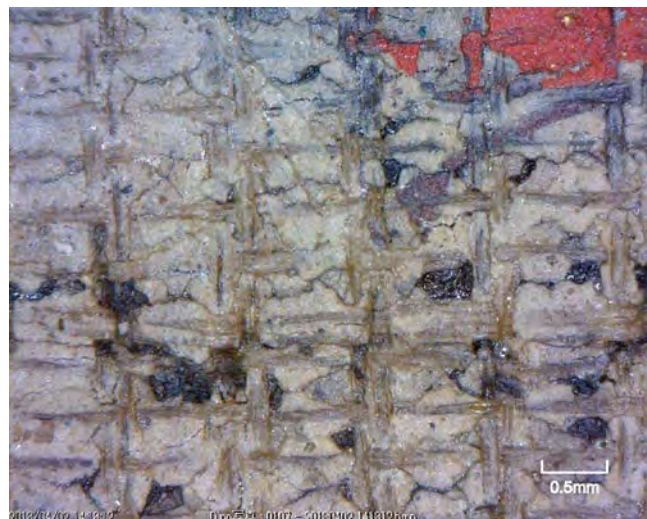
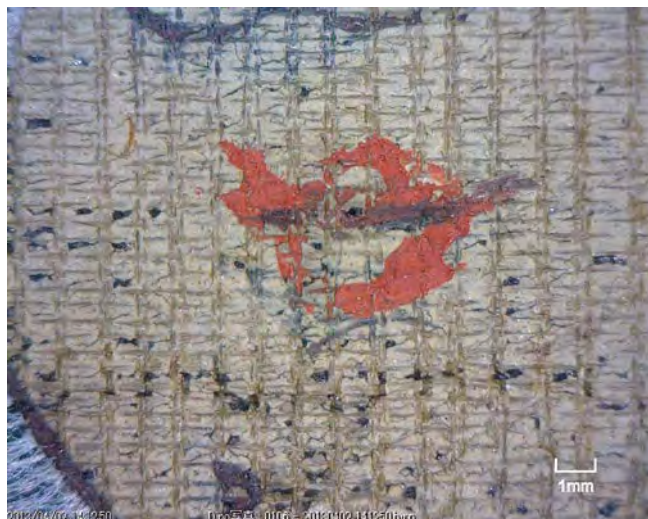


Fig. A.1.3.4 顕微鏡写真 R(4)

Micrographs R(4)

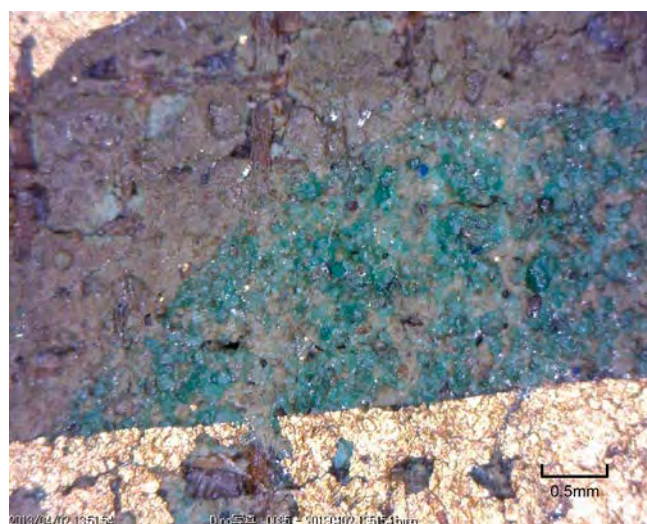
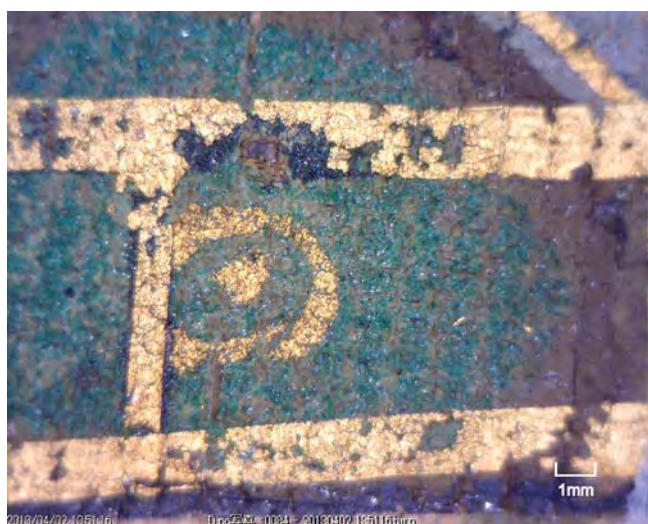


Fig. A.1.3.5 顕微鏡写真 R(5)

Micrographs R(5)

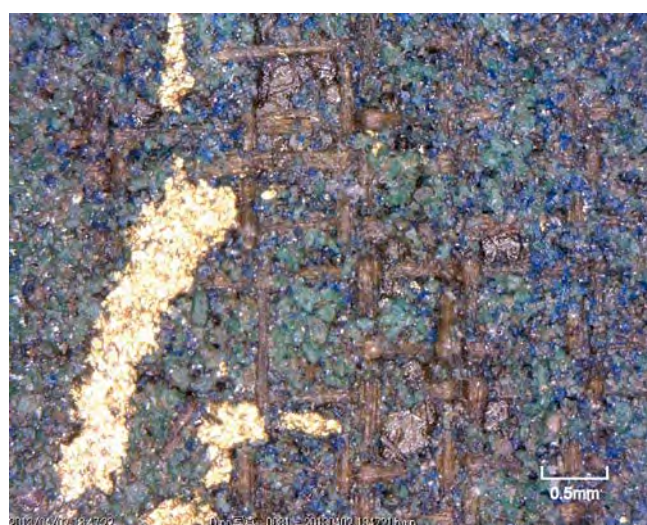


Fig. A.1.3.6 顕微鏡写真 R(6)

Micrographs R(6)



Fig. A.1.3.7 顕微鏡写真 R(7)
Micrographs R(7)

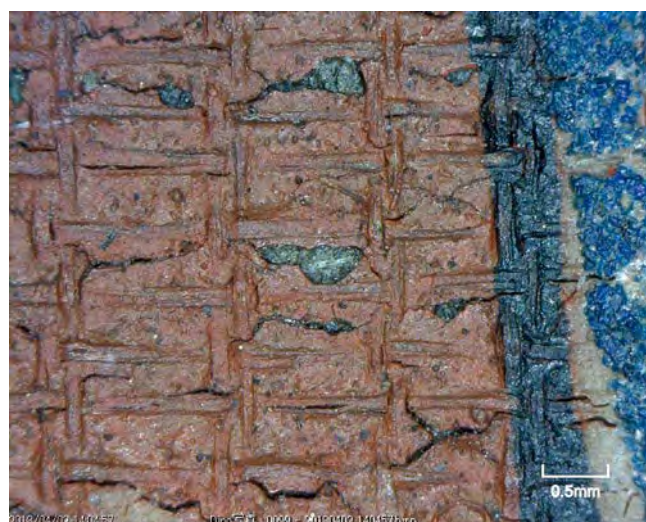


Fig. A.1.3.8 顕微鏡写真 R(8)
Micrographs R(8)

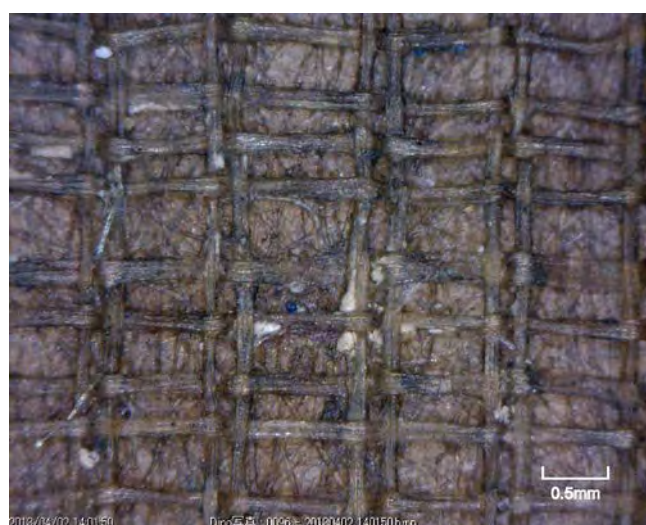
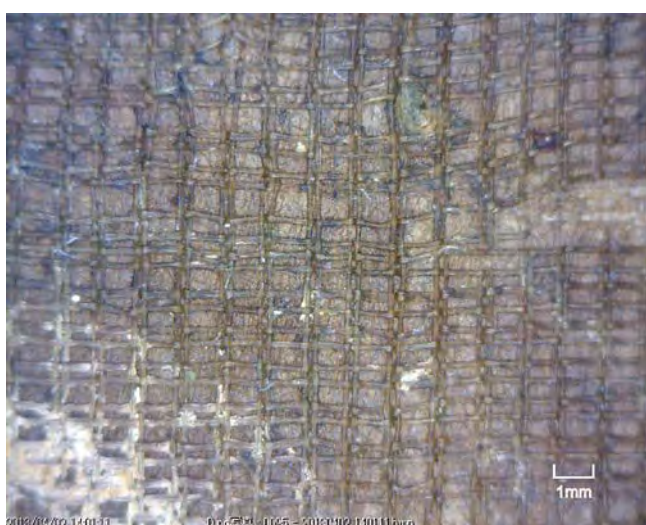


Fig. A.1.3.9 顕微鏡写真 R(9)
Micrographs R(9)

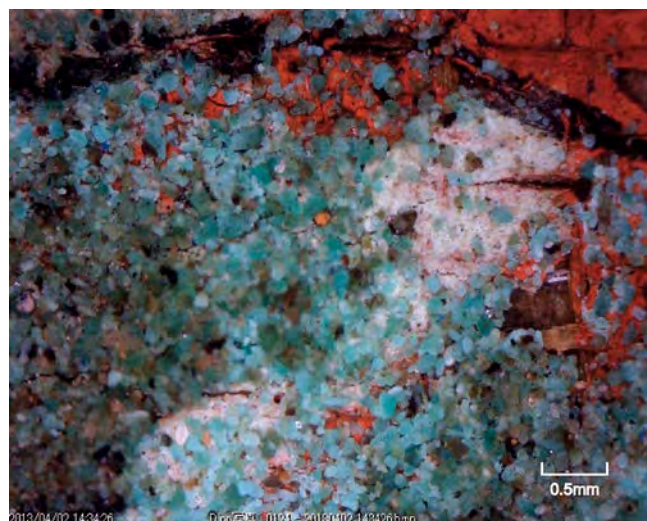
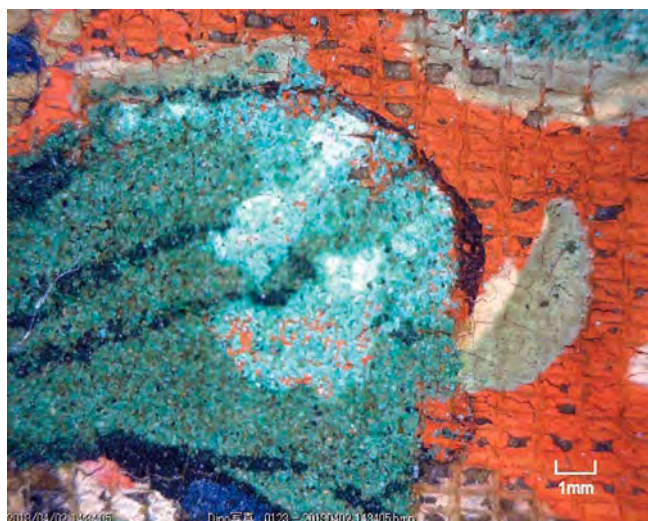


Fig. A.1.3.10 顕微鏡写真 R(10)
Micrographs R(10)

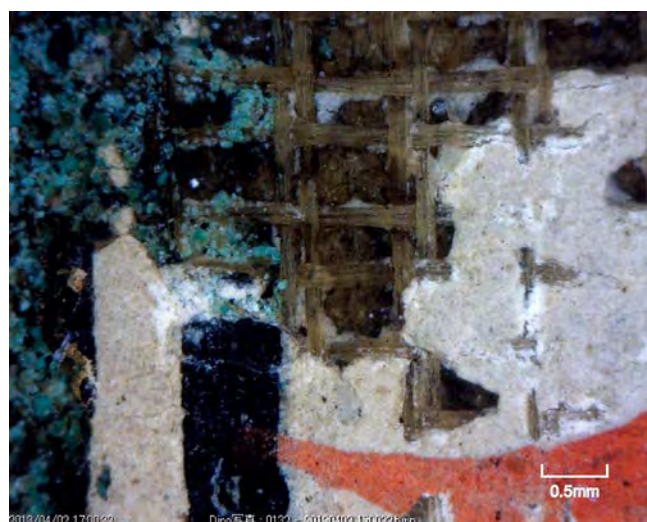
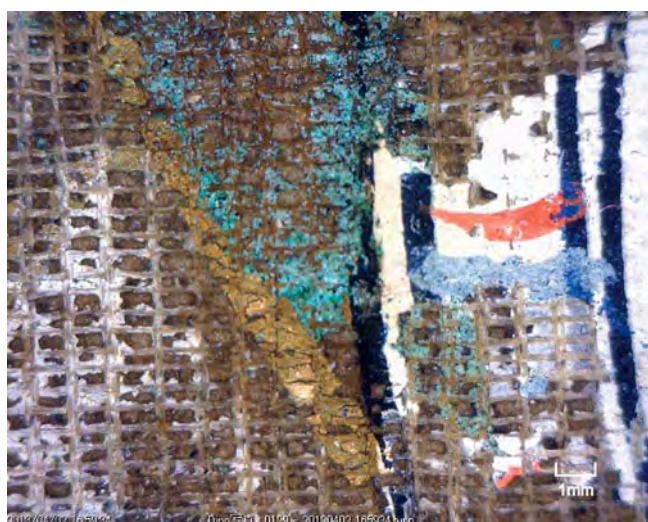


Fig. A.1.3.11 顕微鏡写真 R(11)
Micrographs R(11)

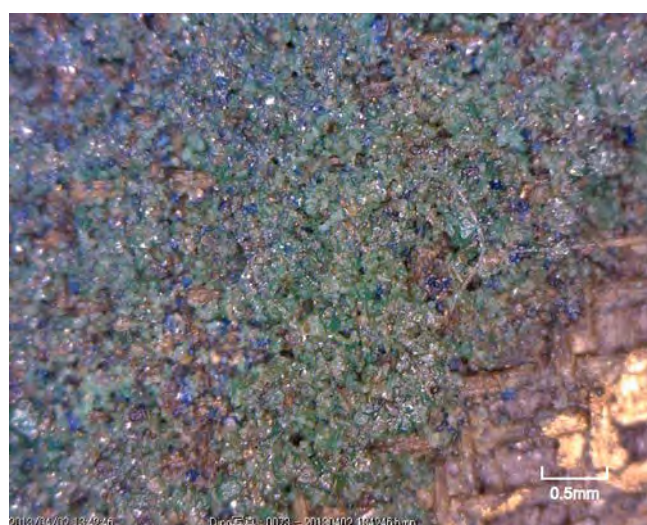
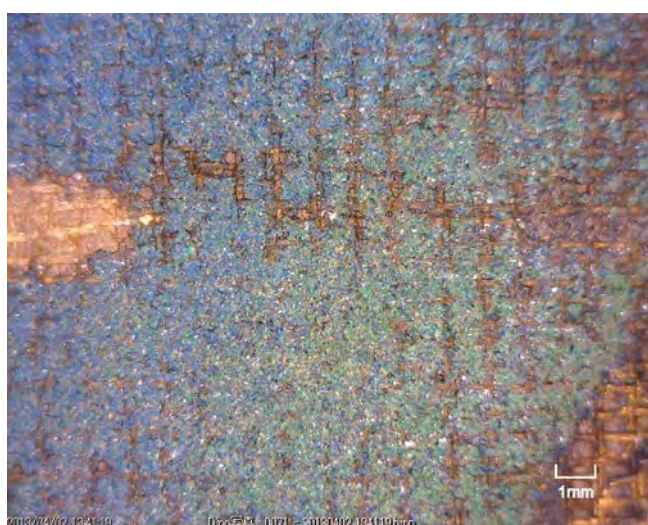


Fig. A.1.3.12 顕微鏡写真 R(12)
Micrographs R(12)

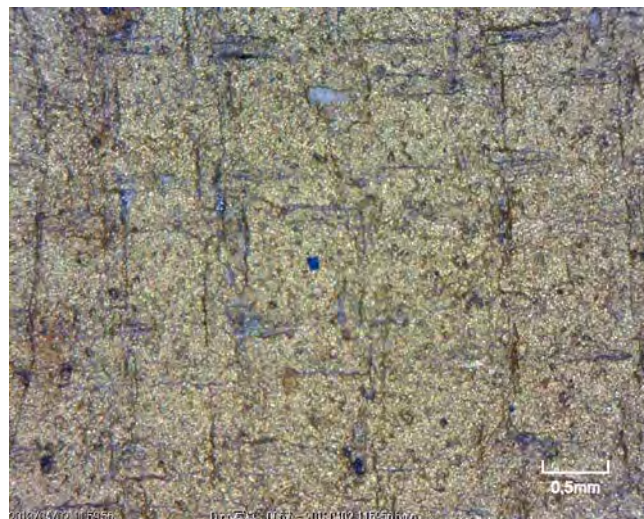


Fig. A.1.3.13 顕微鏡写真 R(13)

Micrographs R(13)

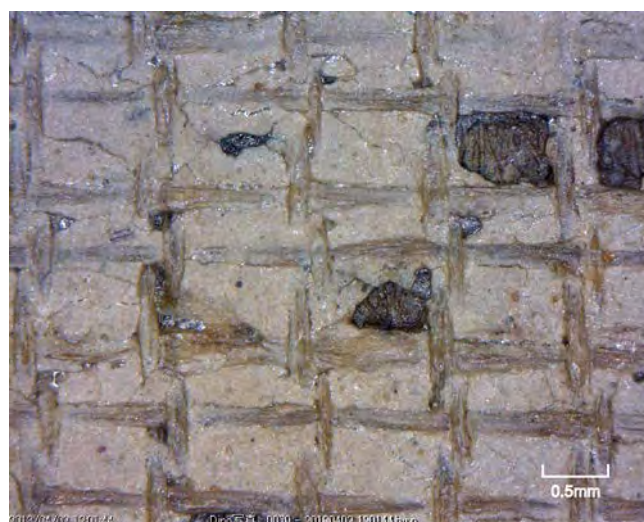


Fig. A.1.3.14 顕微鏡写真 R(14)

Micrographs R(14)

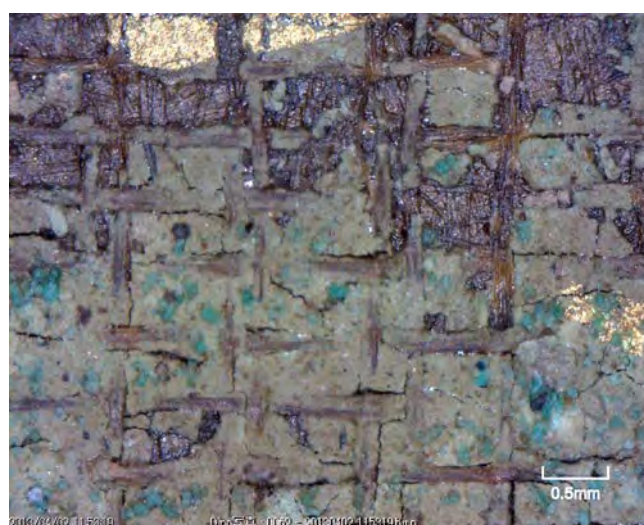
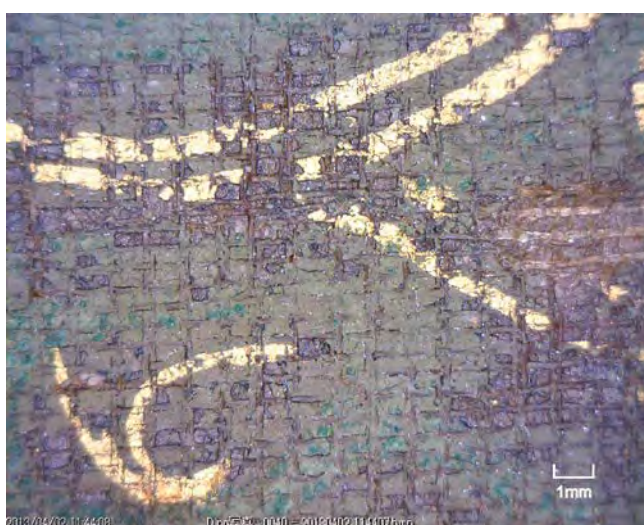


Fig. A.1.3.15 顕微鏡写真 R(15)

Micrographs R(15)

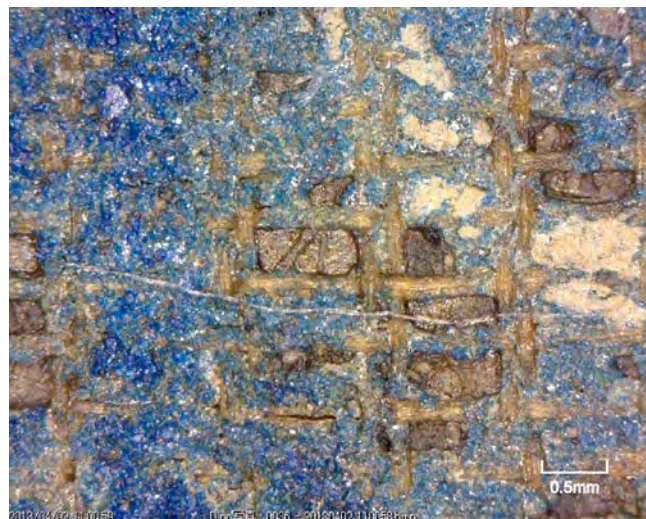
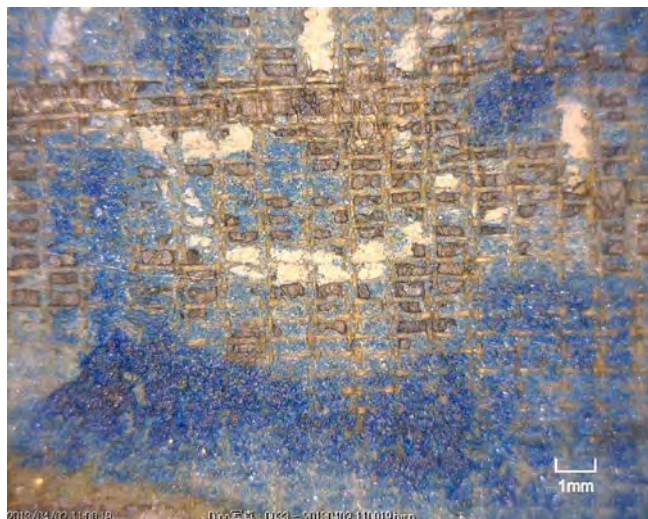


Fig. A.1.3.16 顕微鏡写真 R(16)

Micrographs R(16)

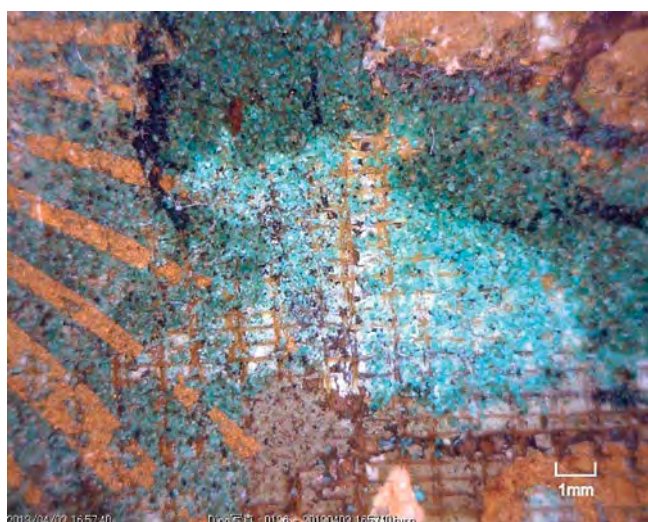


Fig. A.1.3.17 顕微鏡写真 R(17)

Micrographs R(17)

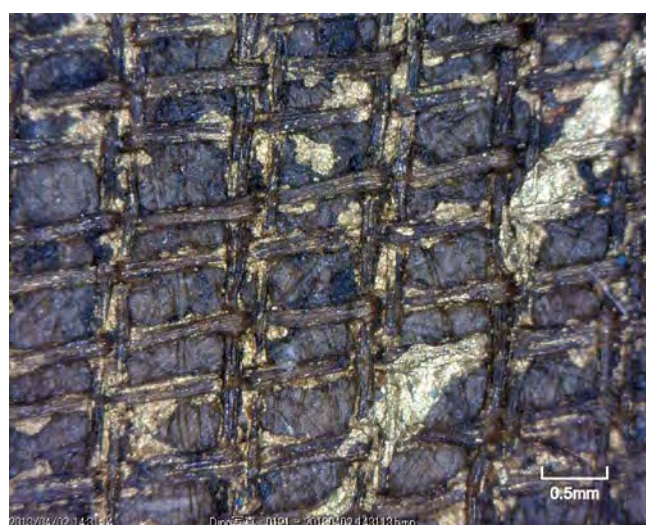
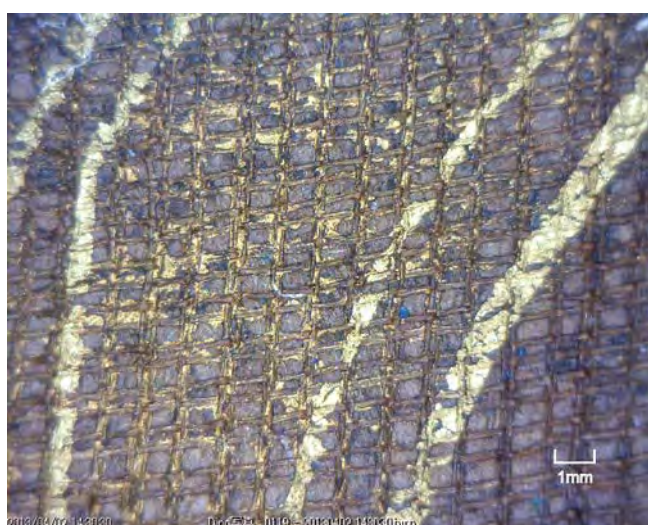


Fig. A.1.3.18 顕微鏡写真 R(18)

Micrographs R(18)

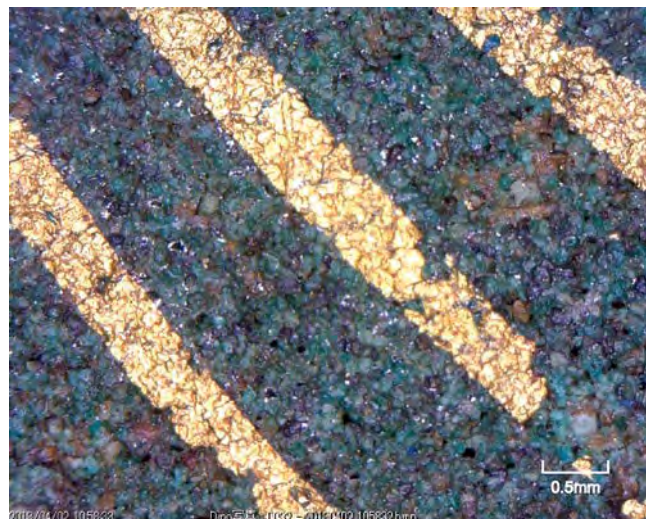
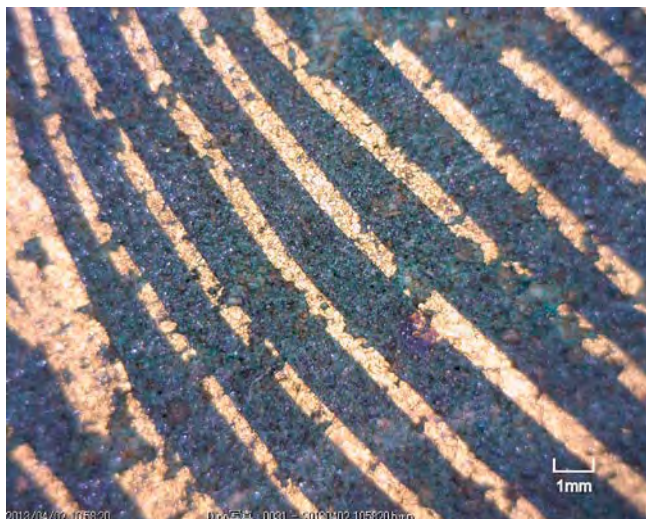


Fig. A.1.3.19 顕微鏡写真 R(19)

Micrographs R(19)



Fig. A.1.3.20 顕微鏡写真 R(20)

Micrographs R(20)

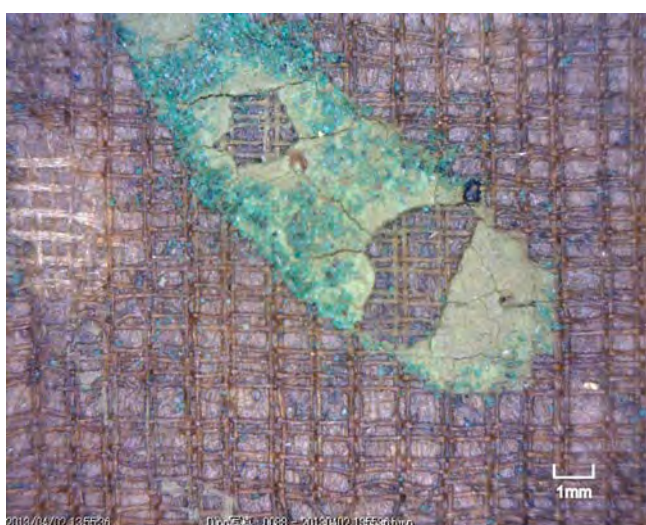


Fig. A.1.3.21 顕微鏡写真 R(21)

Micrographs R(21)

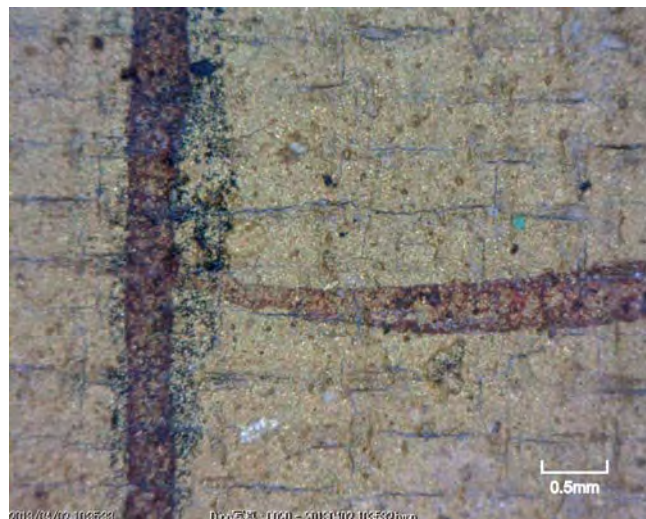
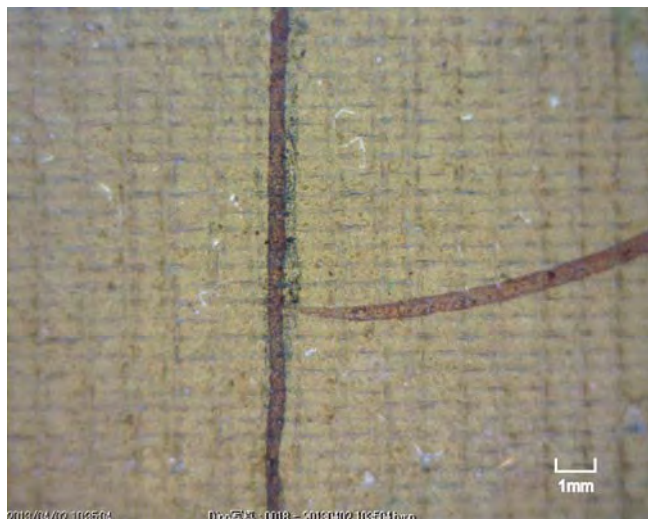


Fig. A.1.3.22 顕微鏡写真 R(22)

Micrographs R(22)

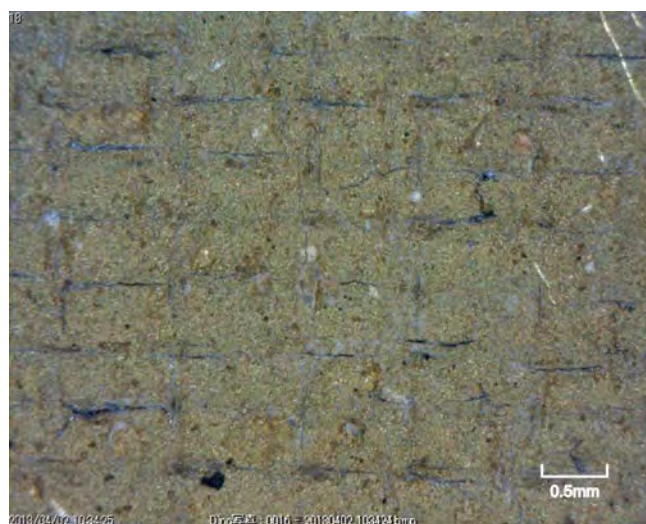
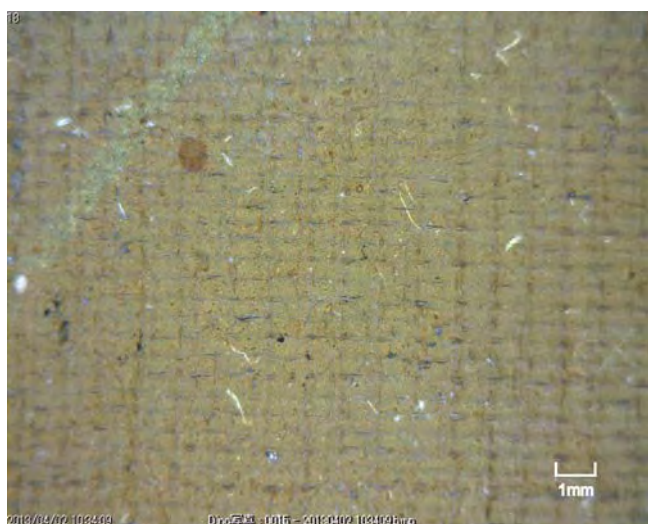


Fig. A.1.3.23 顕微鏡写真 R(23)

Micrographs R(23)

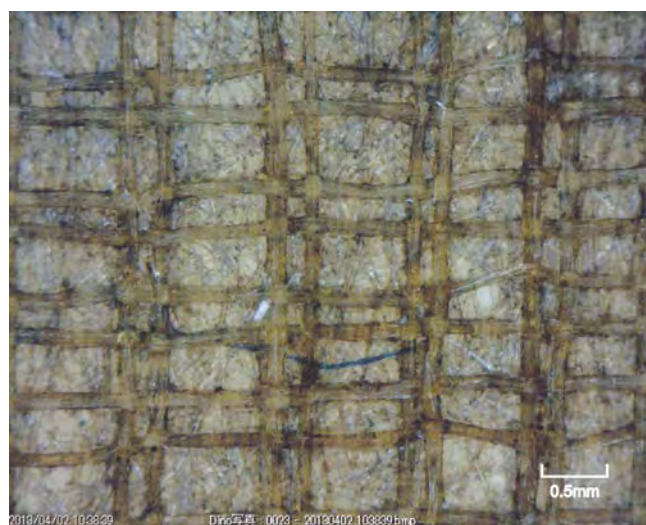
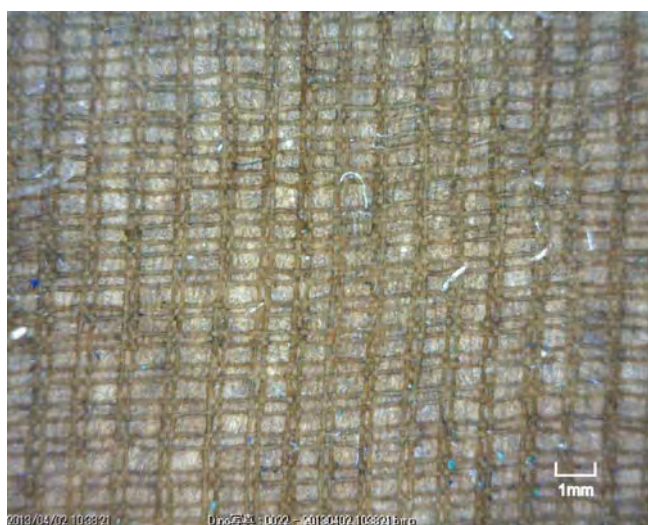


Fig. A.1.3.24 顕微鏡写真 R(24)

Micrographs R(24)

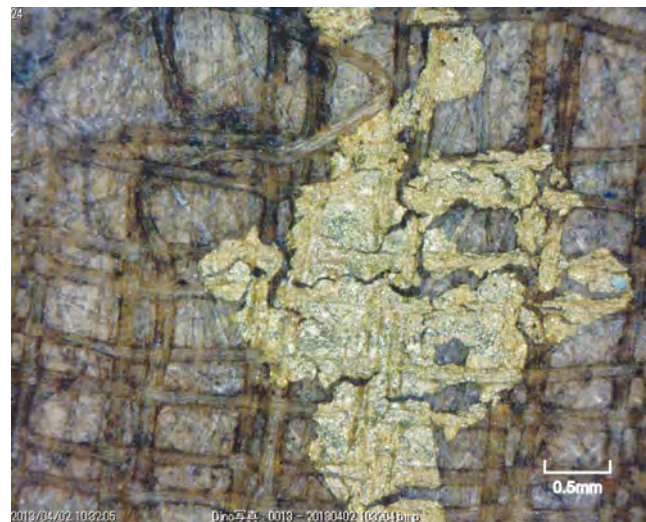
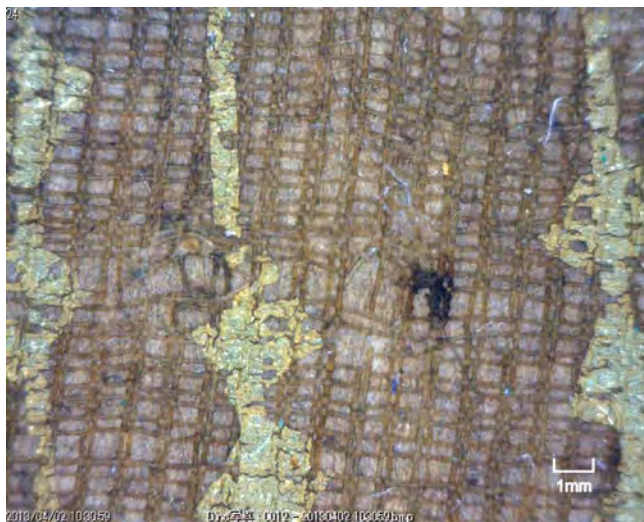


Fig. A.1.3.25 顕微鏡写真 R(25)
Micrographs R(25)

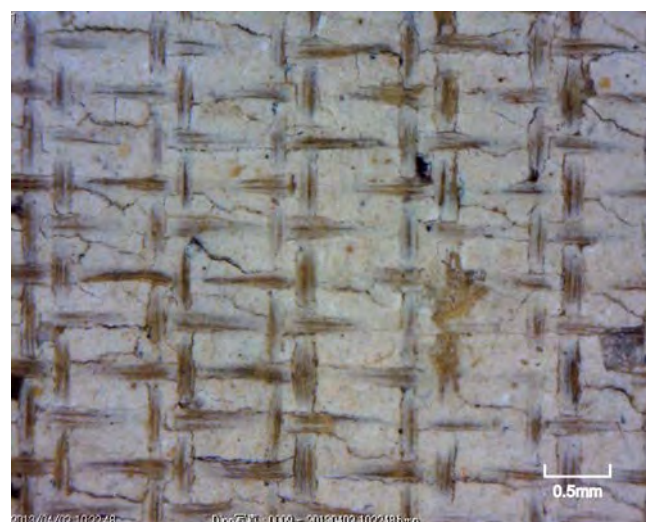
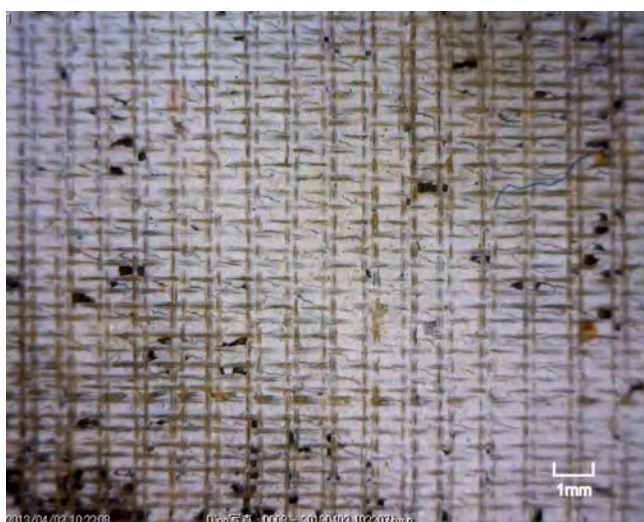


Fig. A.1.3.26 顕微鏡写真 R(26)
Micrographs R(26)

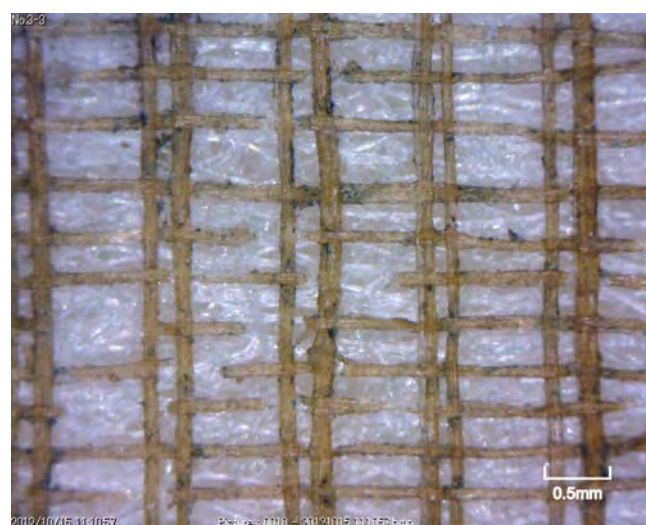
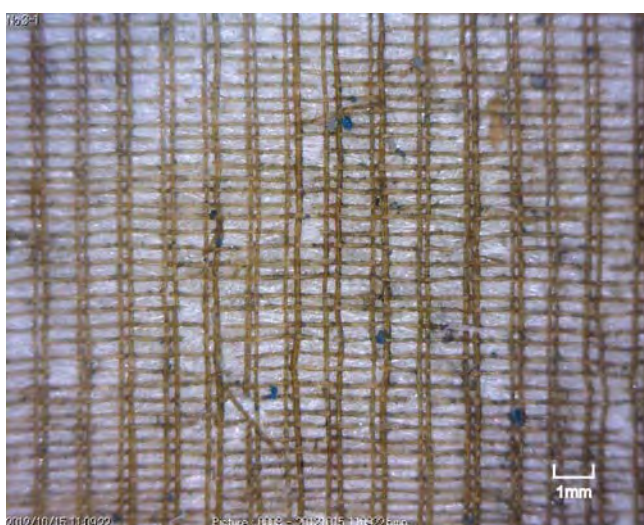


Fig. A.1.3.27 顕微鏡写真 R(27)
Micrographs R(27)

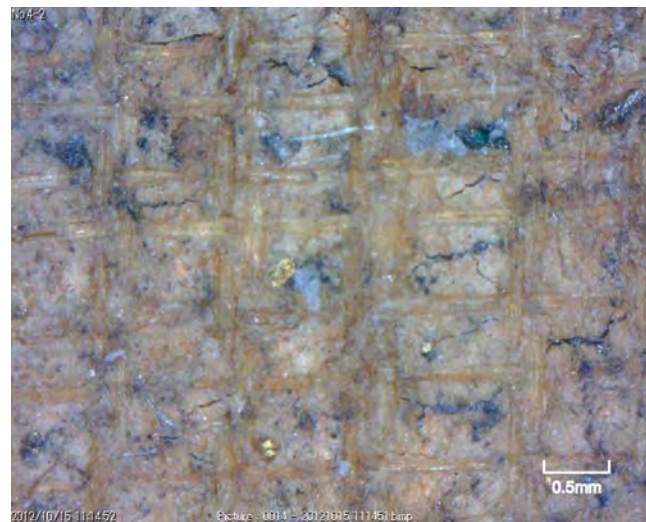
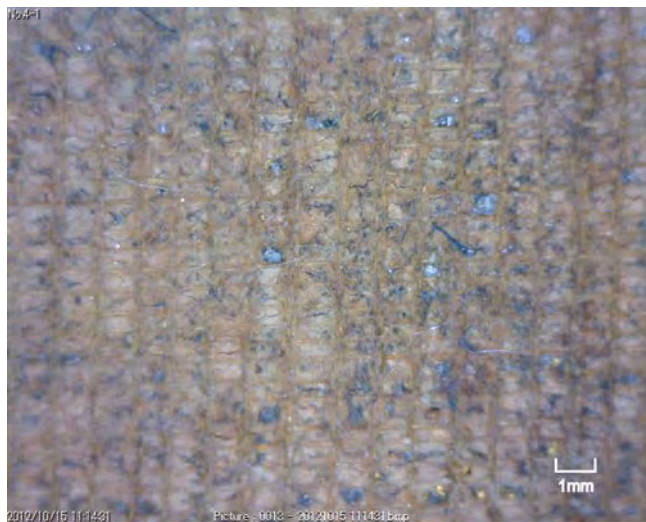


Fig. A.1.3.28 顕微鏡写真 R(28)
Micrographs R(28)

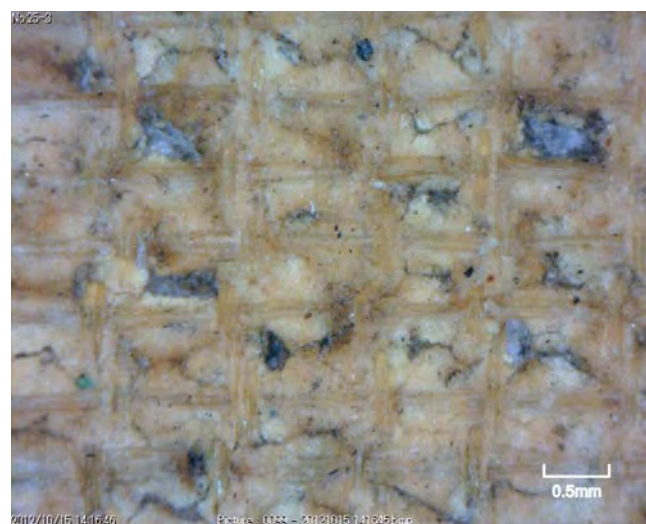
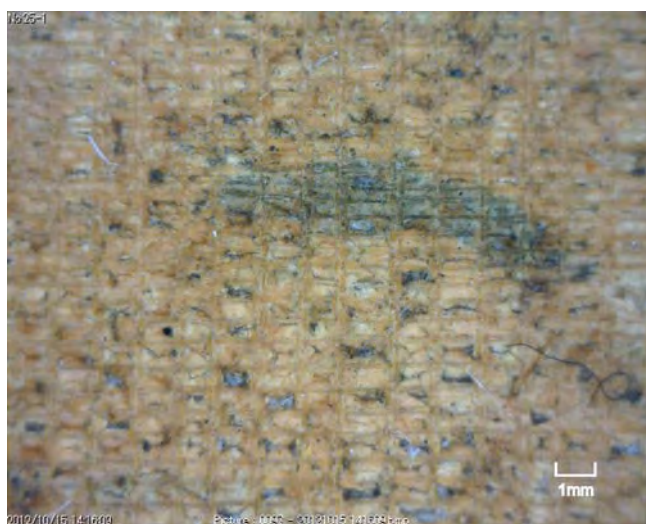


Fig. A.1.3.29 顕微鏡写真 R(29)
Micrographs R(29)

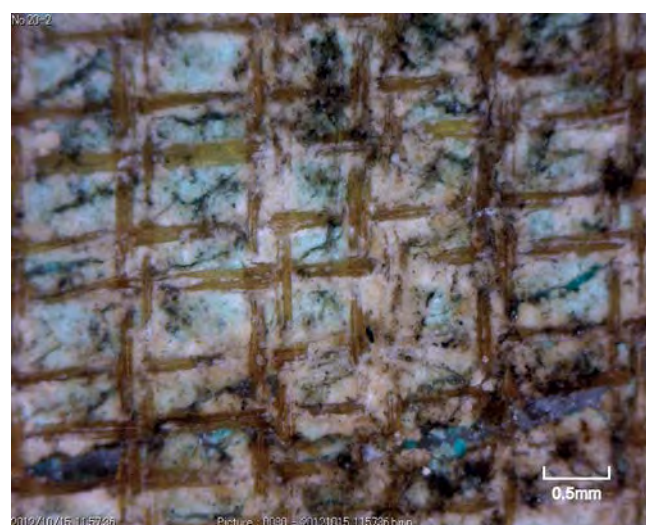
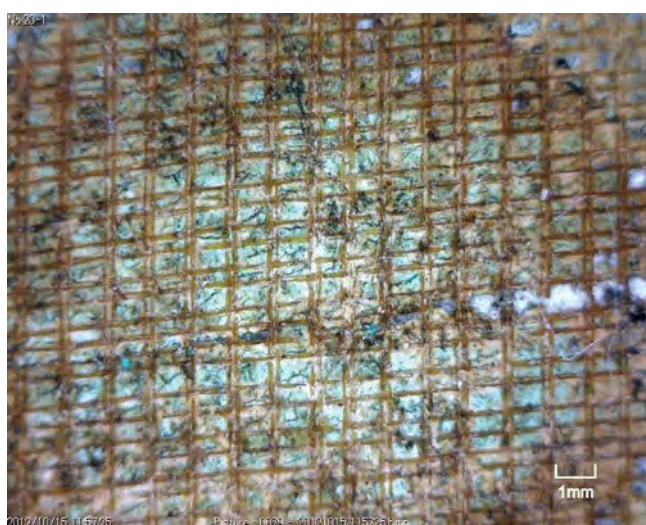


Fig. A.1.3.30 顕微鏡写真 R(30)
Micrographs R(30)

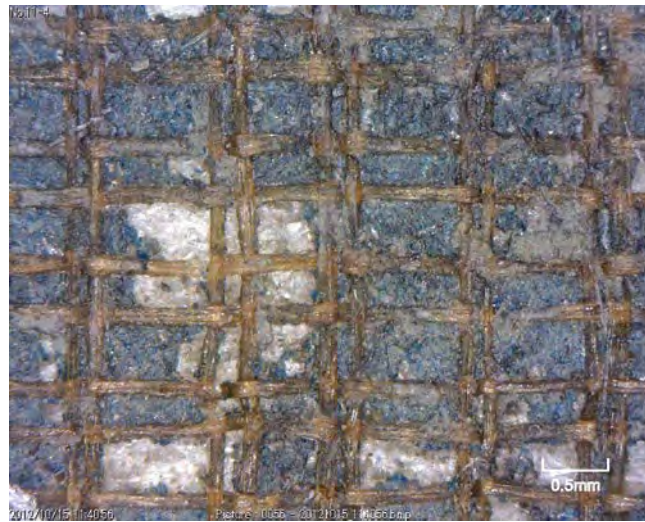


Fig. A.1.3.31 顕微鏡写真 R(31)
Micrographs R(31)

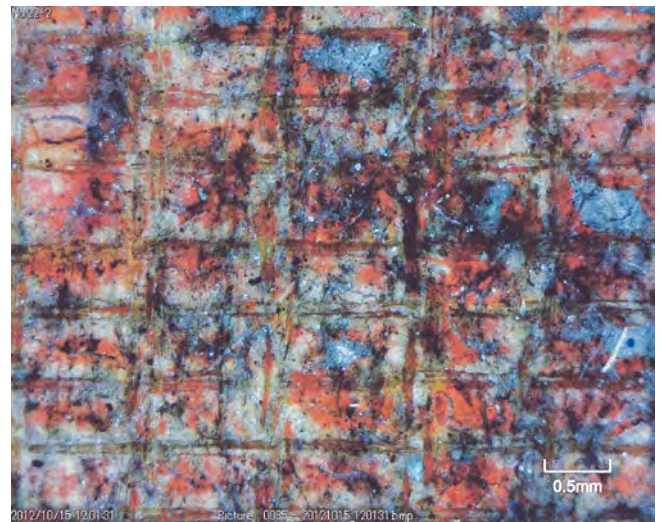
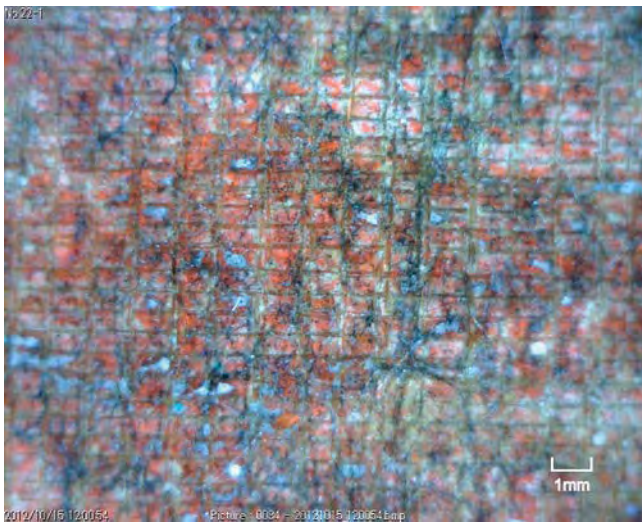


Fig. A.1.3.32 顕微鏡写真 R(32)
Micrographs R(32)

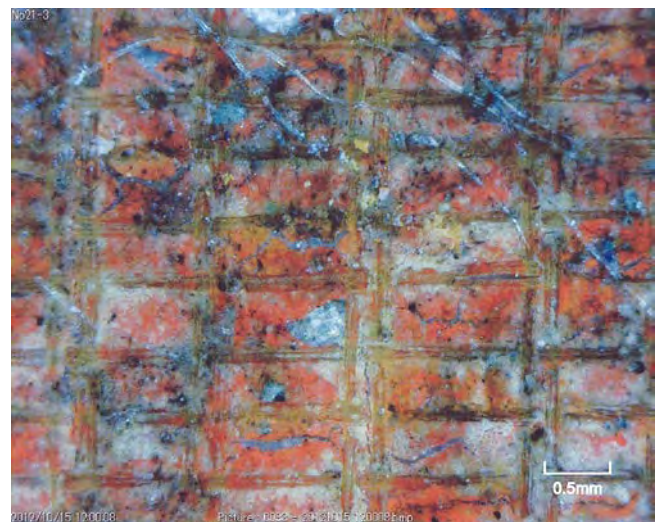
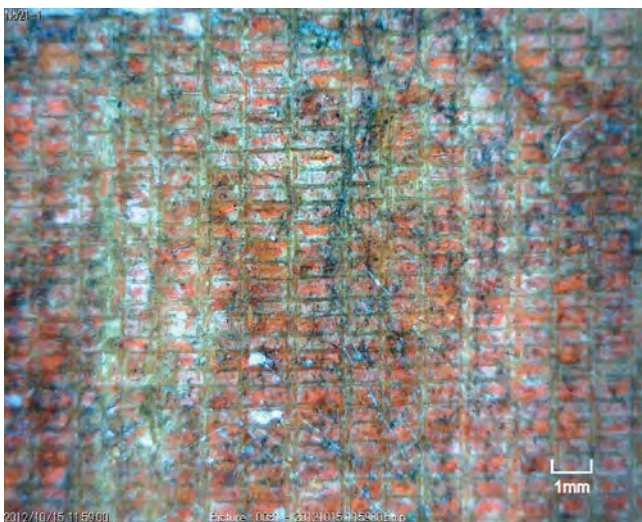


Fig. A.1.3.33 顕微鏡写真 R(33)
Micrographs R(33)

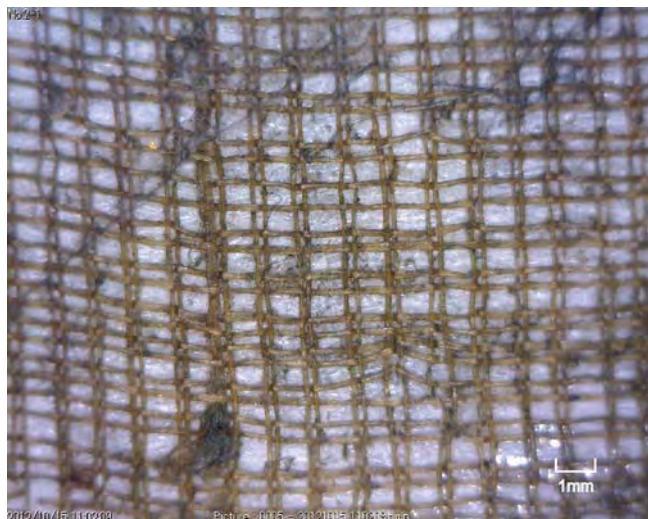


Fig. A.1.3.34 顕微鏡写真 R(34)
Micrographs R(34)

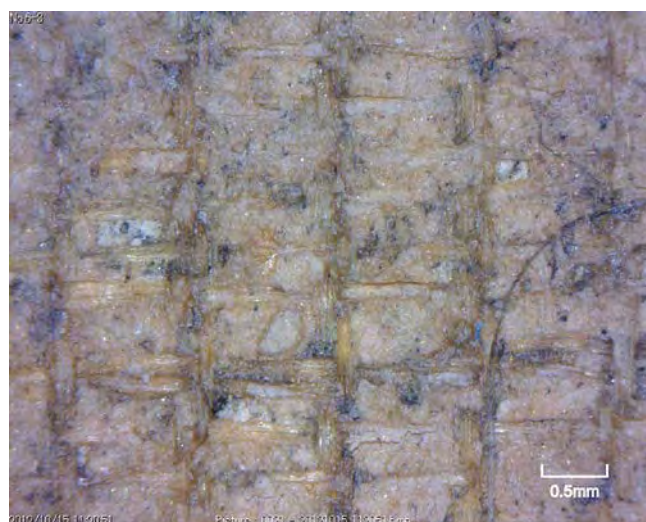
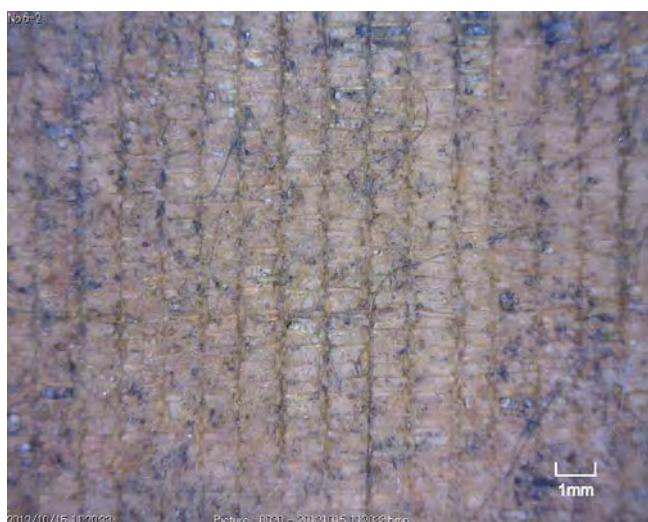


Fig. A.1.3.35 顕微鏡写真 R(35)
Micrographs R(35)

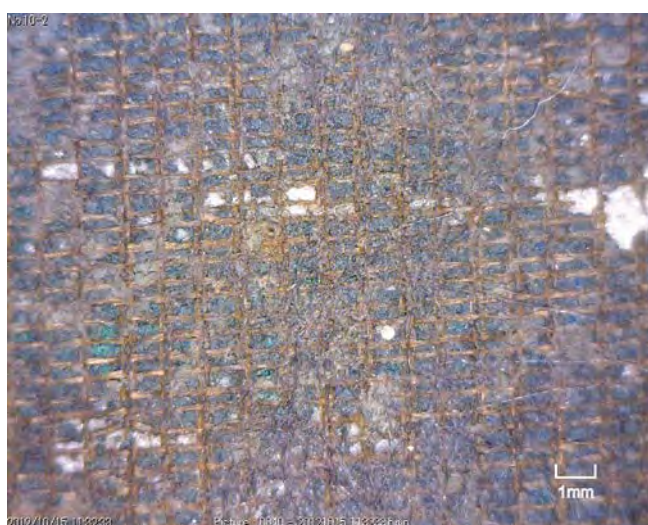


Fig. A.1.3.36 顕微鏡写真 R(36)
Micrographs R(36)

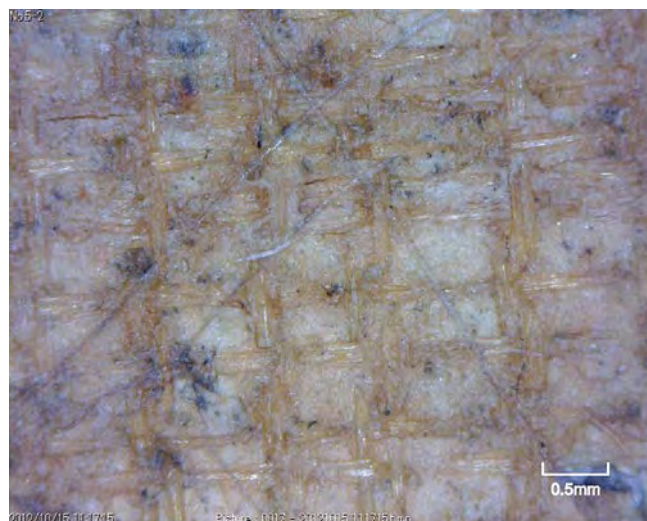
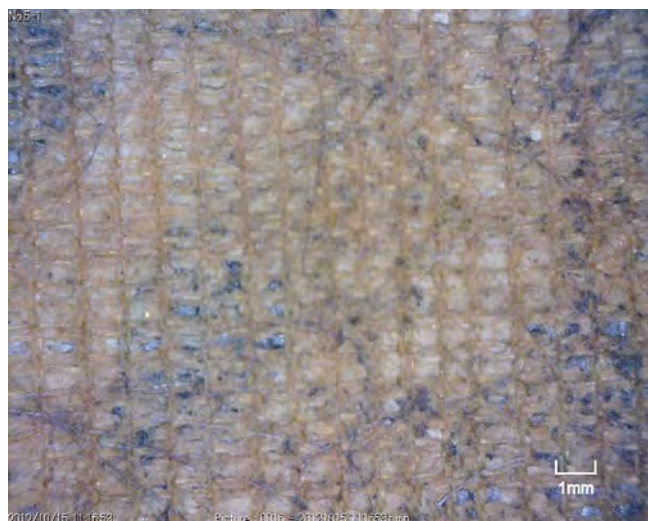


Fig. A.1.3.37 顕微鏡写真 R(37)
Micrographs R(37)

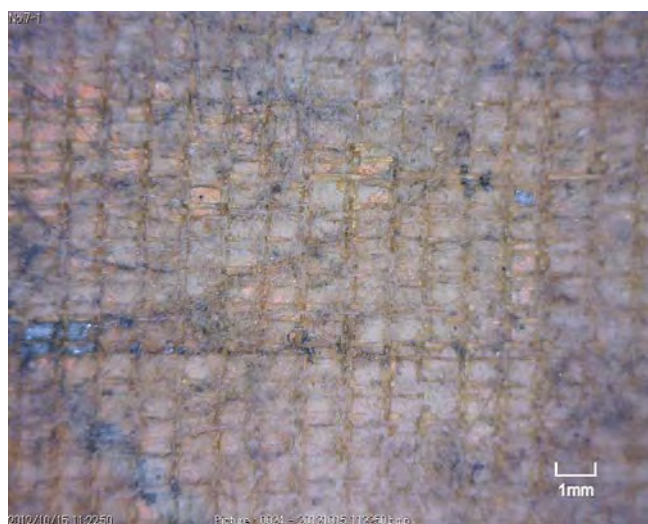


Fig. A.1.3.38 顕微鏡写真 R(38)
Micrographs R(38)

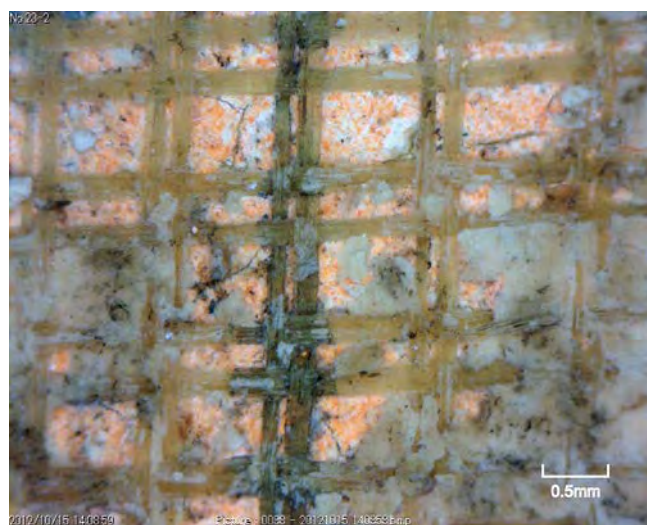
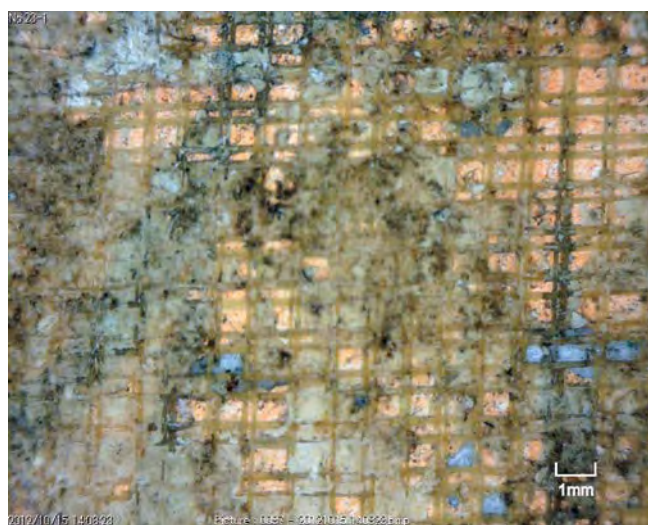


Fig. A.1.3.39 顕微鏡写真 R(39)
Micrographs R(39)

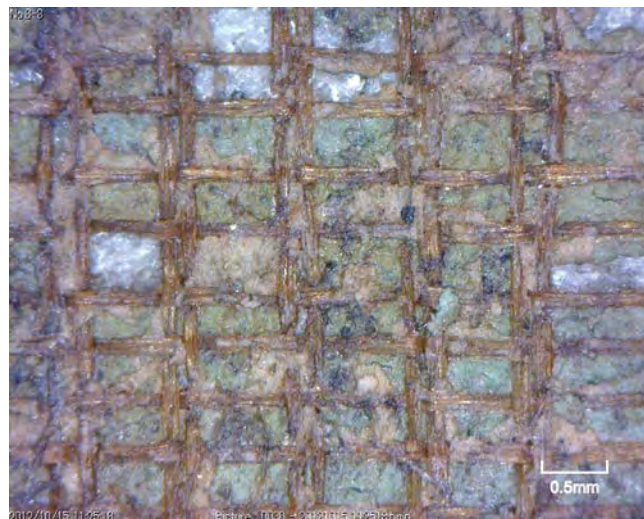
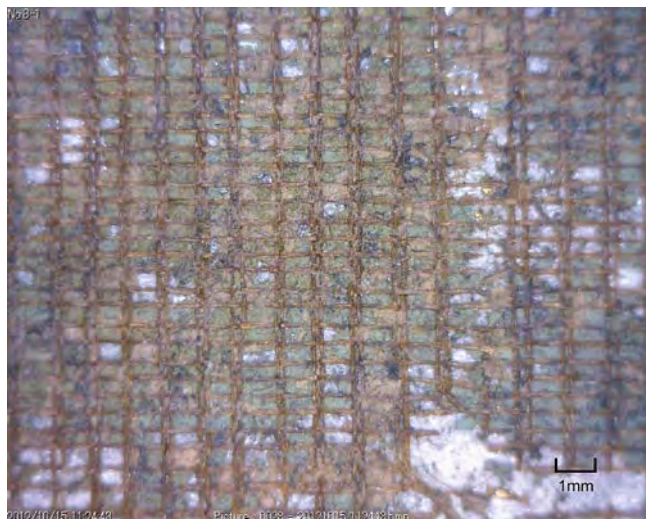


Fig. A.1.3.40 顕微鏡写真 R(40)
Micrographs R(40)

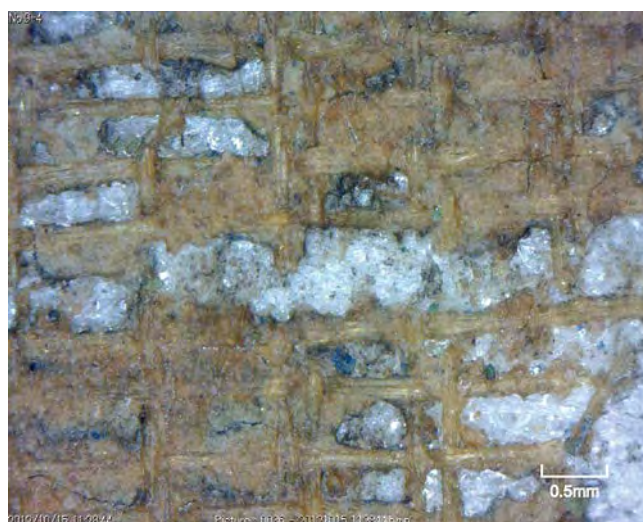


Fig. A.1.3.41 顕微鏡写真 R(41)
Micrographs R(41)

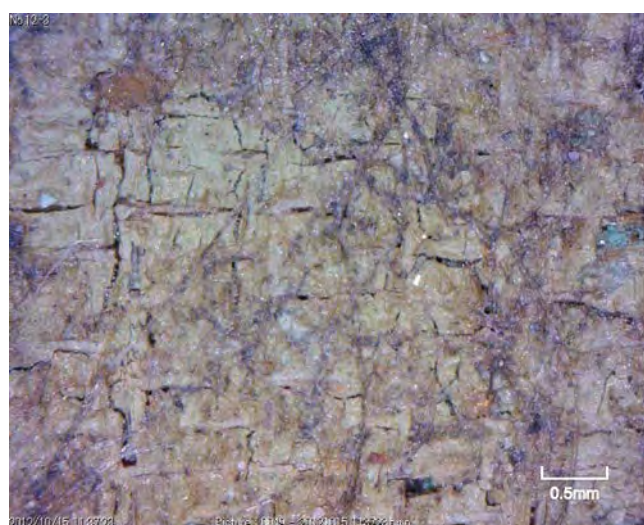
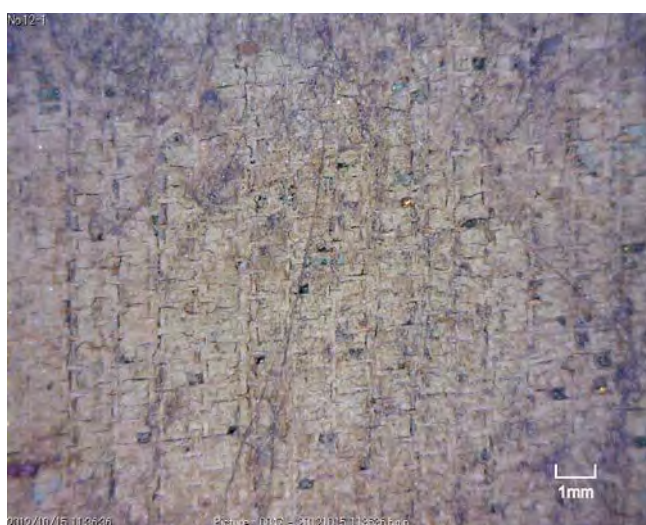


Fig. A.1.3.42 顕微鏡写真 R(42)
Micrographs R(42)

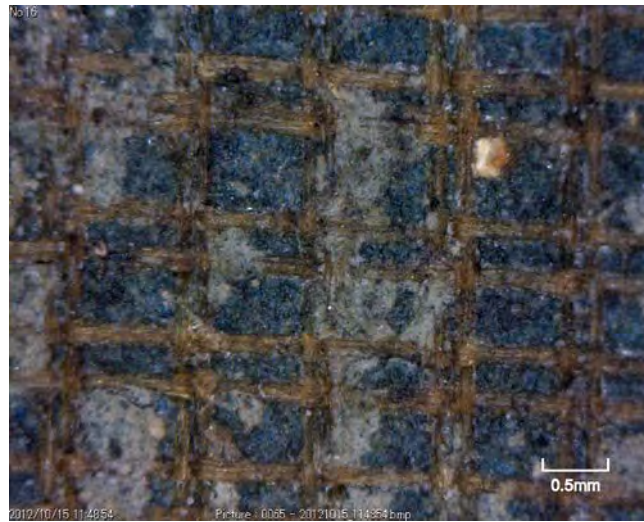


Fig. A.1.3.43 顕微鏡写真 R(43)
Micrographs R(43)

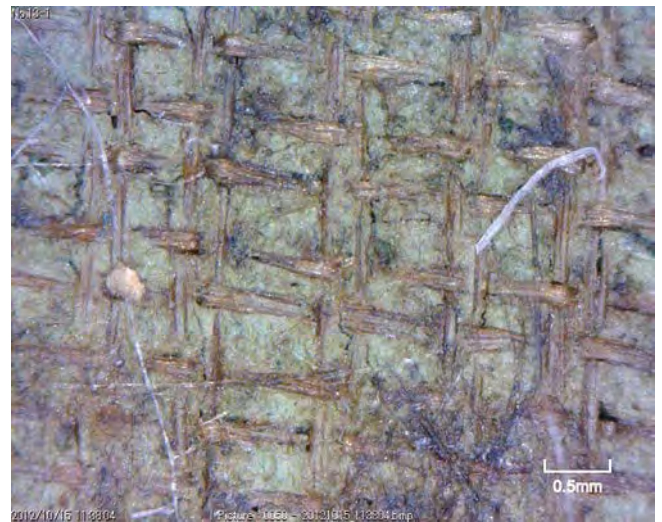
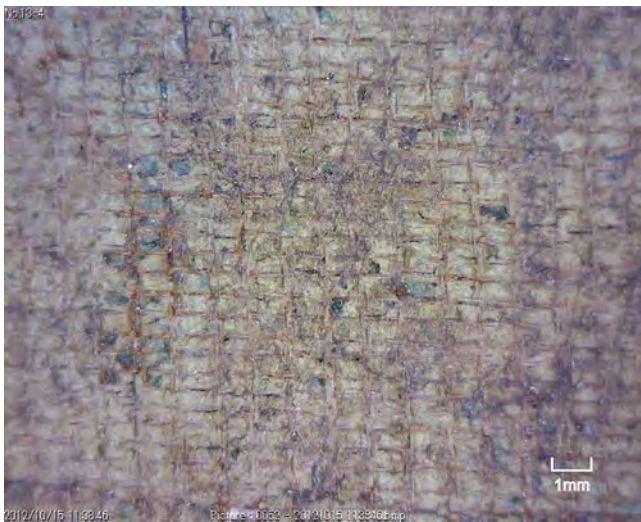


Fig. A.1.3.44 顕微鏡写真 R(44)
Micrographs R(44)

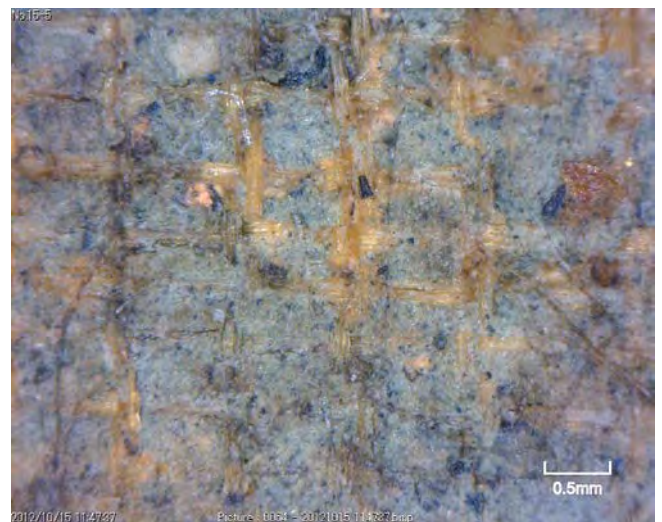
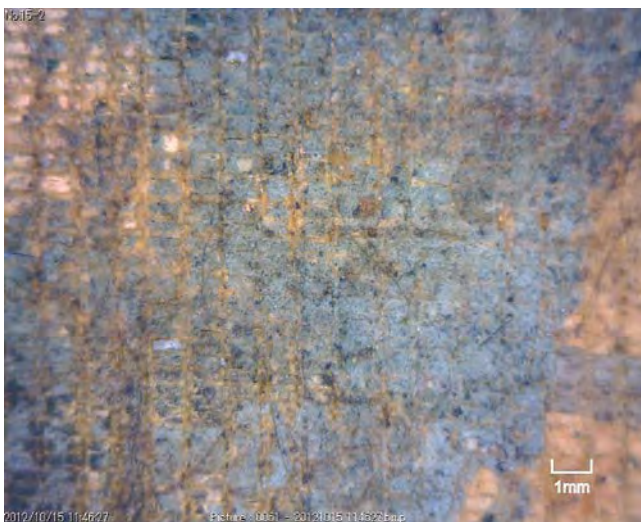


Fig. A.1.3.45 顕微鏡写真 R(45)
Micrographs R(45)

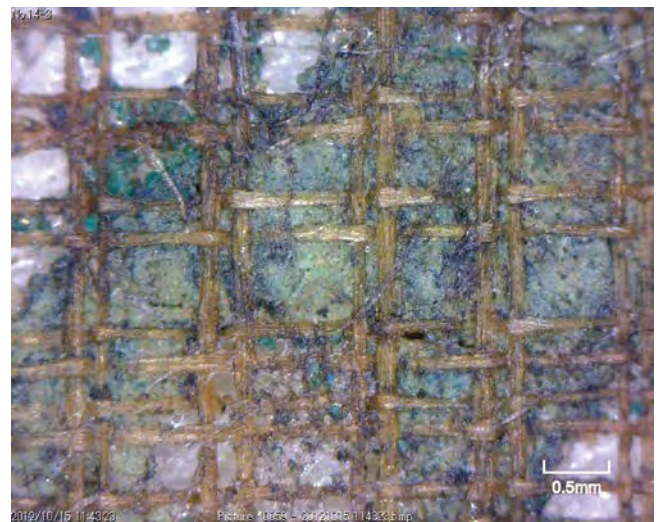
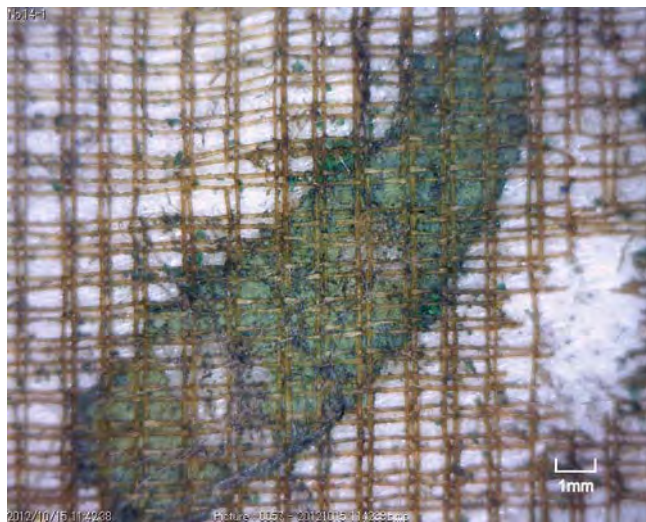


Fig. A.1.3.46 顕微鏡写真 R(46)
Micrographs R(46)

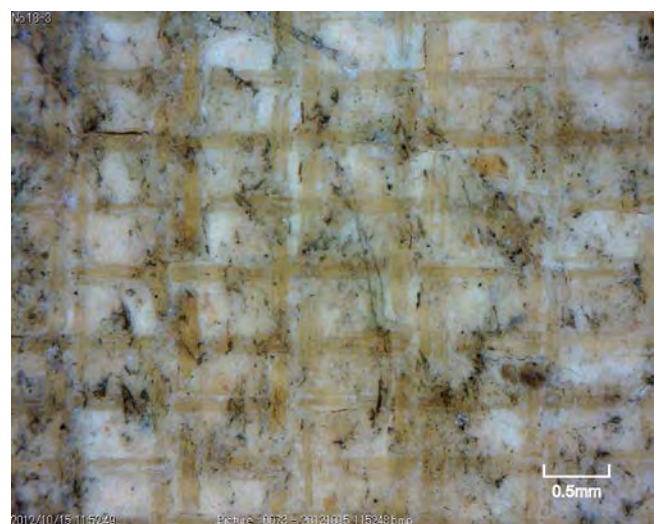
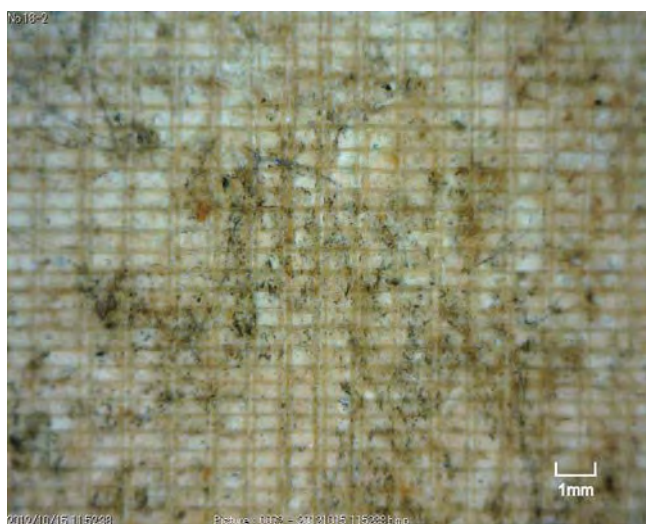


Fig. A.1.3.47 顕微鏡写真 R(47)
Micrographs R(47)

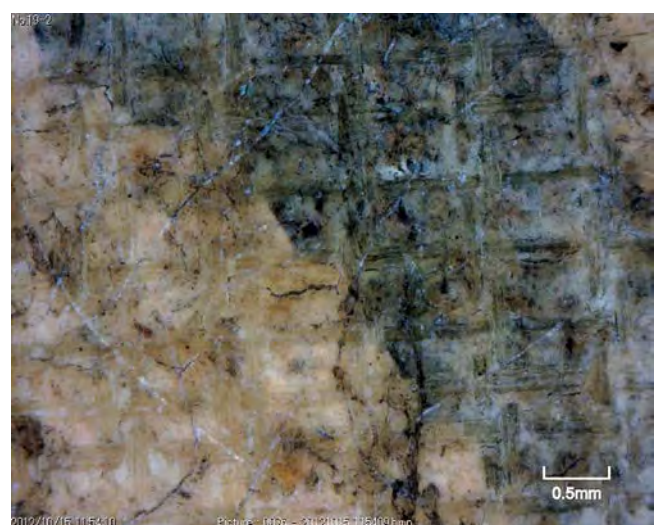
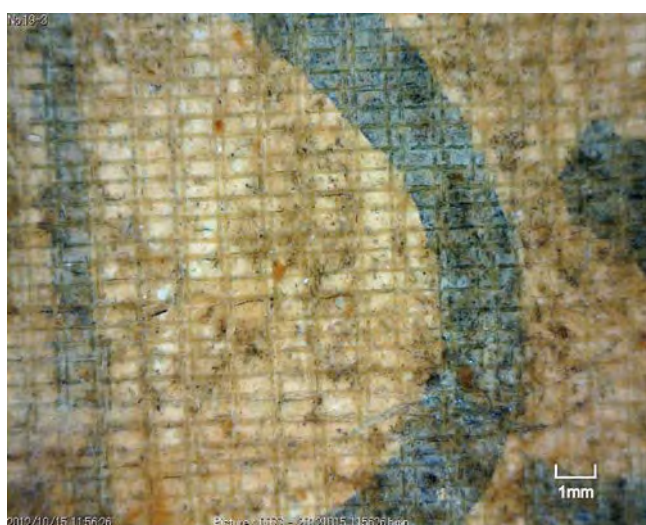


Fig. A.1.3.48 顕微鏡写真 R(48)
Micrographs R(48)

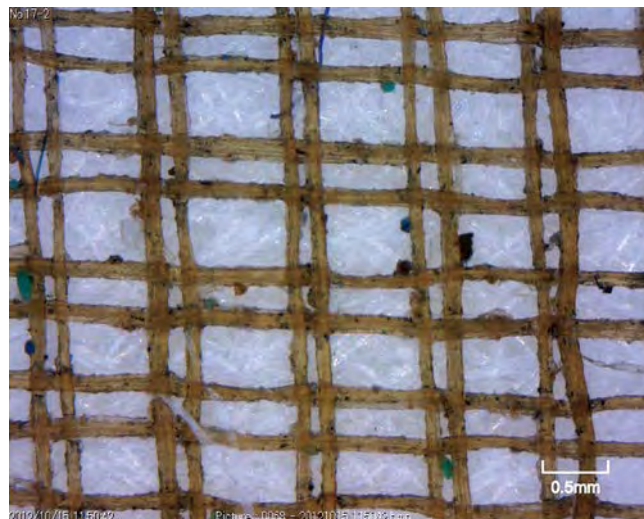
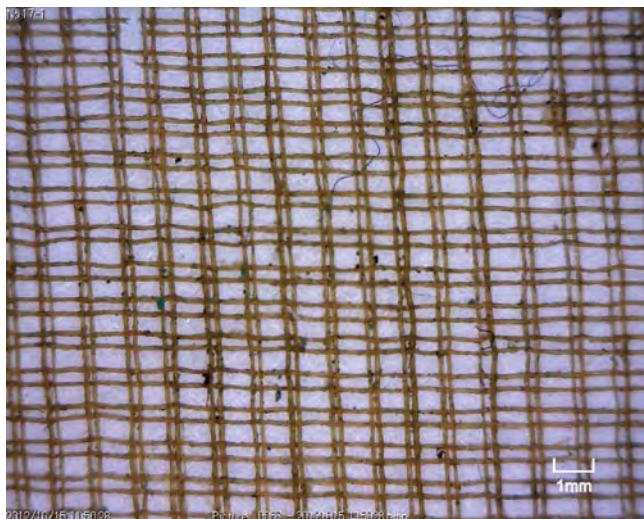


Fig. A.1.3.49 顕微鏡写真 R(49)
Micrographs R(49)

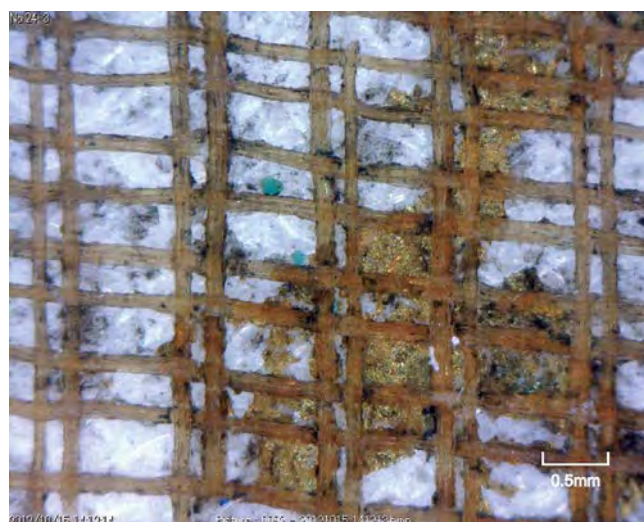
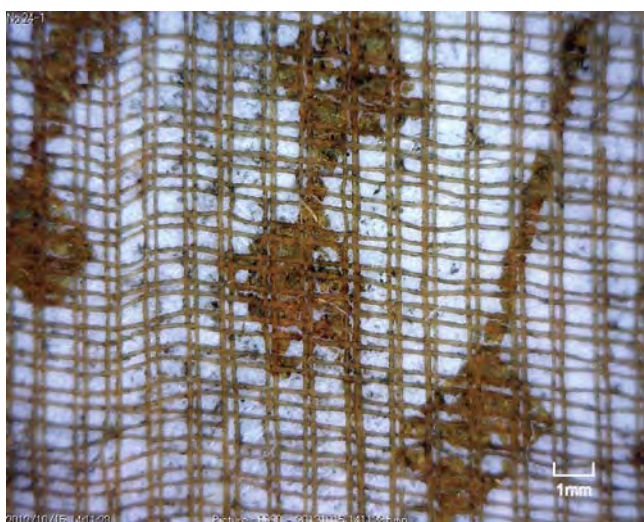


Fig. A.1.3.50 顕微鏡写真 R(50)
Micrographs R(50)

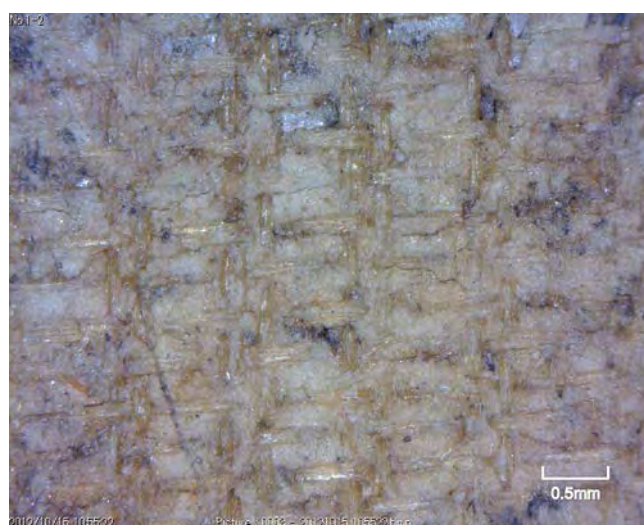
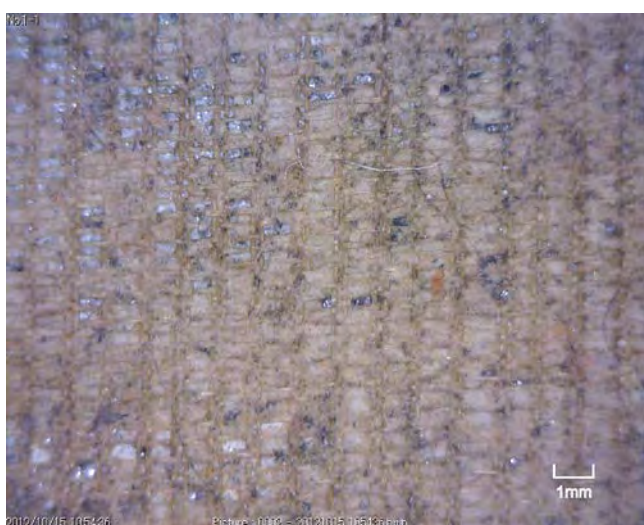
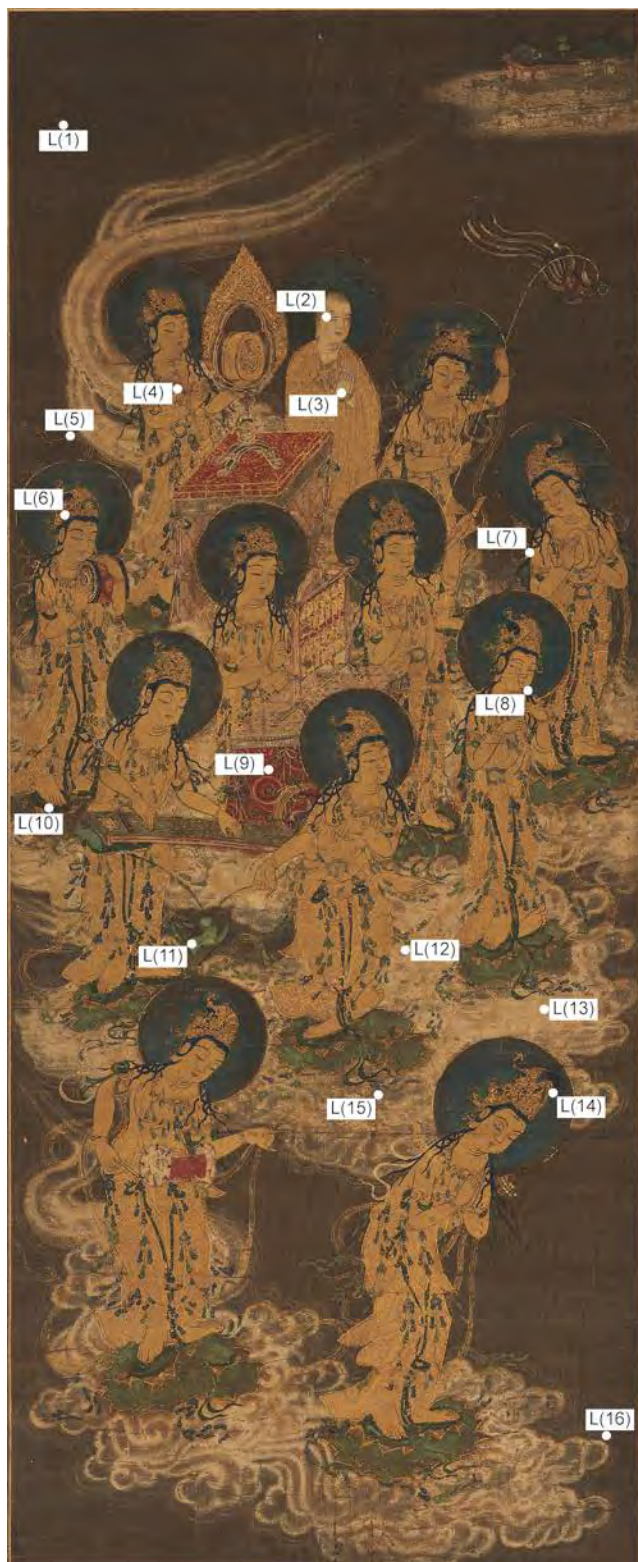


Fig. A.1.3.51 顕微鏡写真 R(51)
Micrographs R(51)



(a)



(b)

Fig. A.1.4 顕微鏡写真撮影箇所 左幅 (a) 表面 (b) 裏面

The points that micrographs were taken, left scroll (a) front side (b) back side

使用機器	デジタルマイクロスコープ Dino-Lite PRO (ANMO Electronics)
ピクセル数	640×480
画像フォーマット	JPEG
Apparatus	Digital Microscope Dino-lite PRO, ANMO Electronics
Image size	640×480
Image format	JPEG

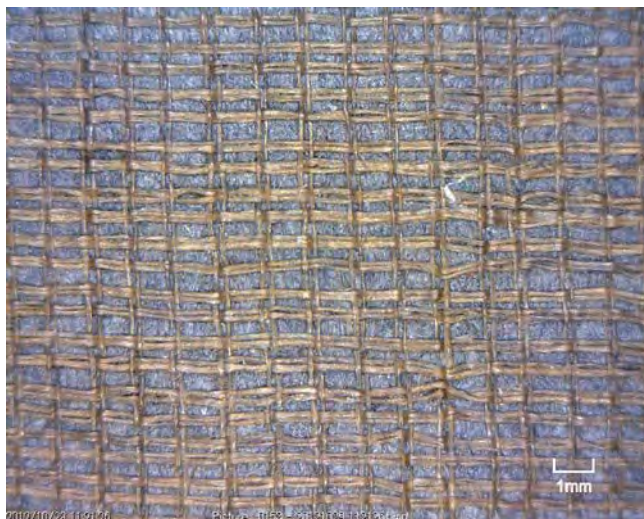


Fig. A.1.4.1 顕微鏡写真 L(1)
Micrographs L(1)

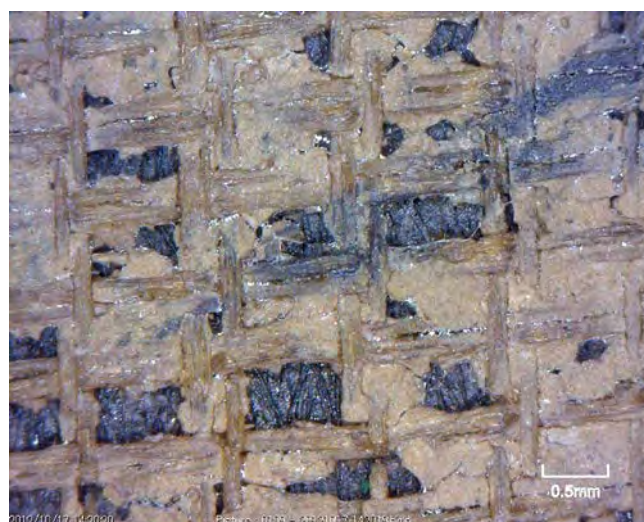
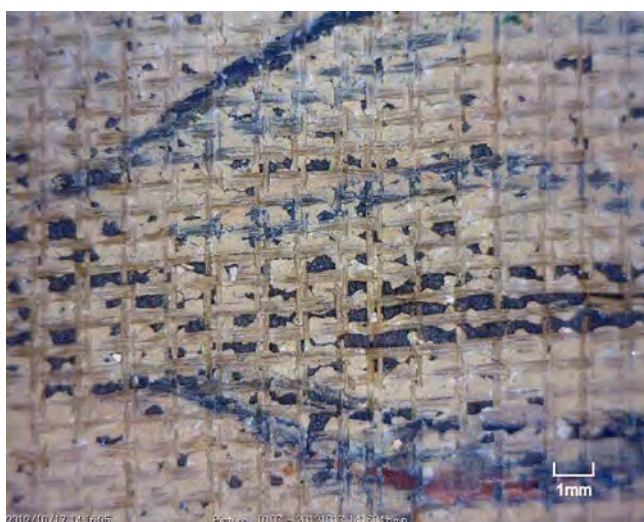


Fig. A.1.4.2 顕微鏡写真 L(2)
Micrographs L(2)

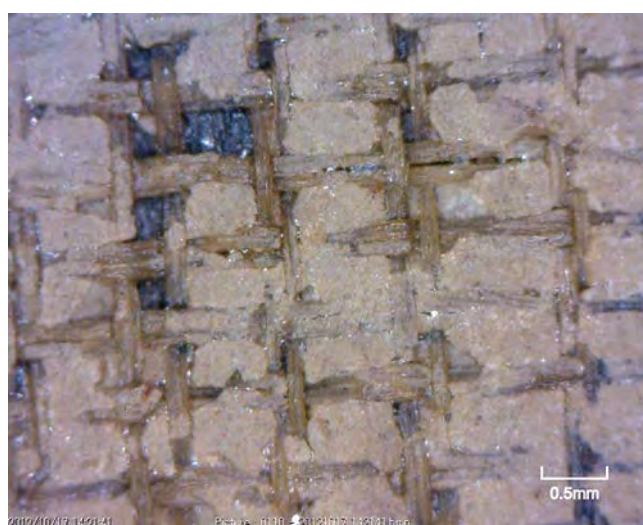


Fig. A.1.4.3 顕微鏡写真 L(3)
Micrographs L(3)

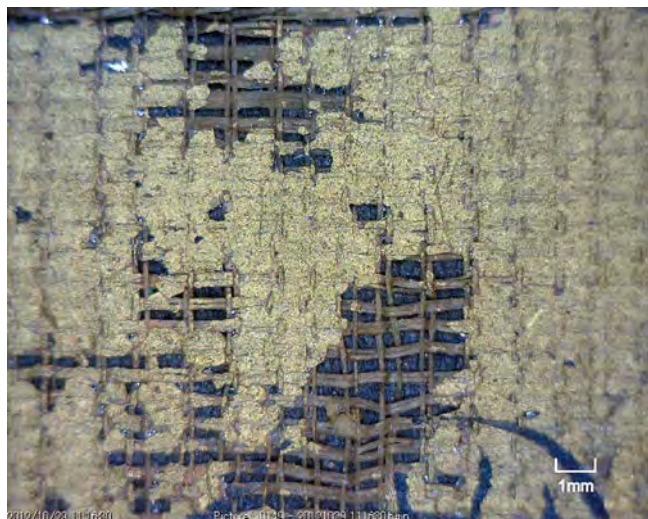


Fig. A.1.4.4 顕微鏡写真 L(4)

Micrographs L(4)

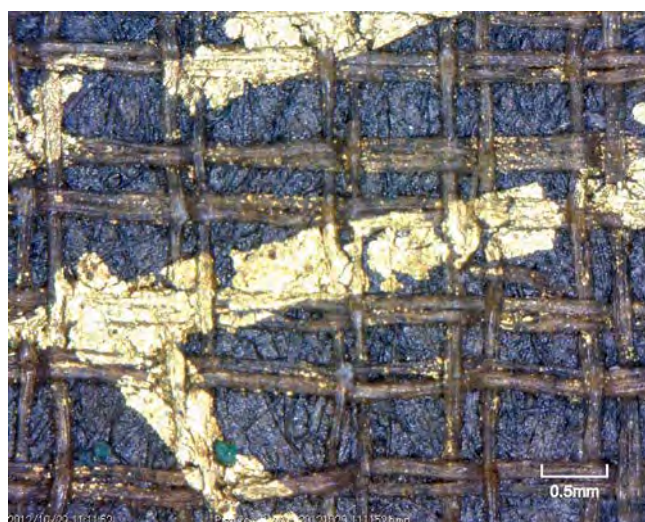


Fig. A.1.4.5 顕微鏡写真 L(5)

Micrographs L(5)

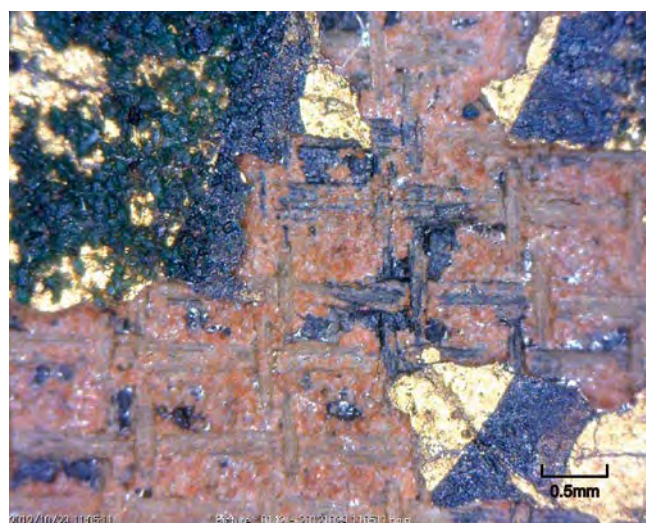
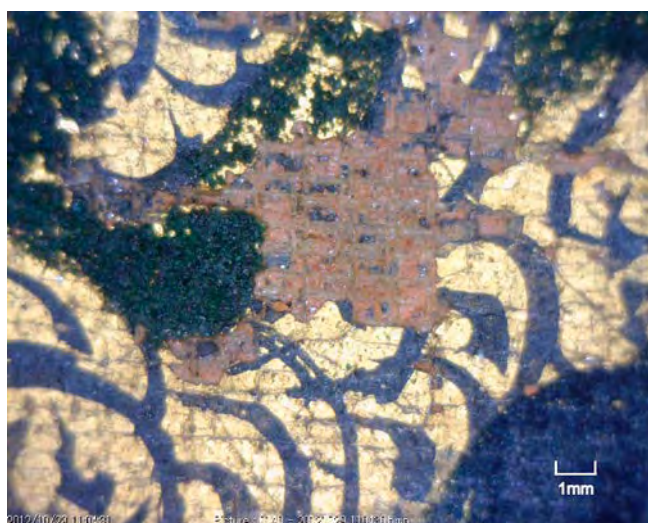


Fig. A.1.4.6 顕微鏡写真 L(6)

Micrographs L(6)

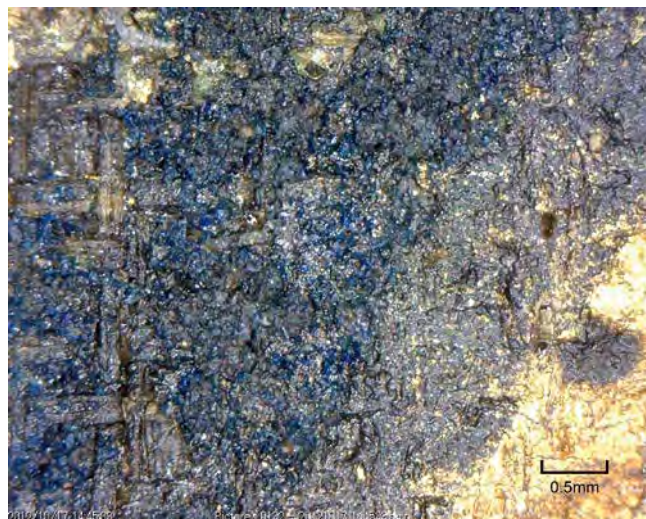
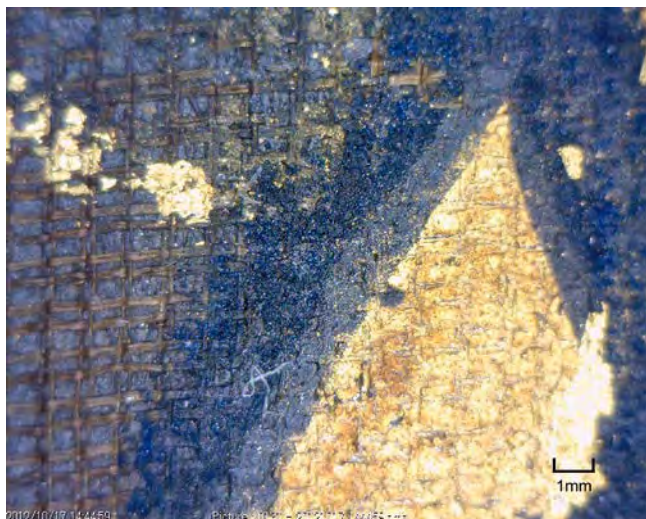


Fig. A.1.4.7 顕微鏡写真 L(7)
Micrographs L(7)

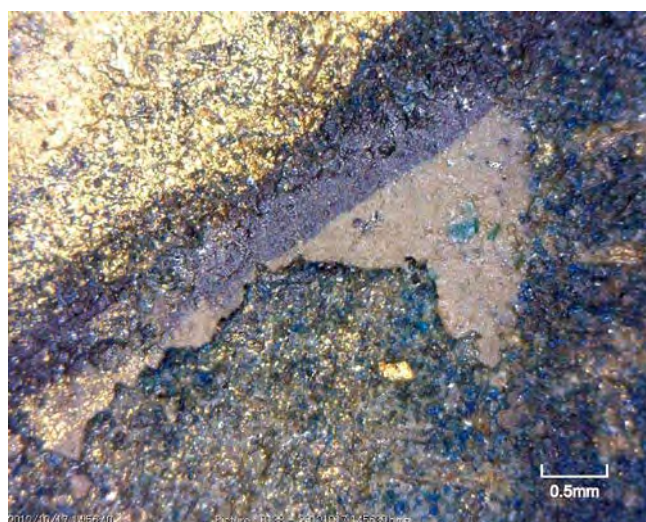


Fig. A.1.4.8 顕微鏡写真 L(8)
Micrographs L(8)

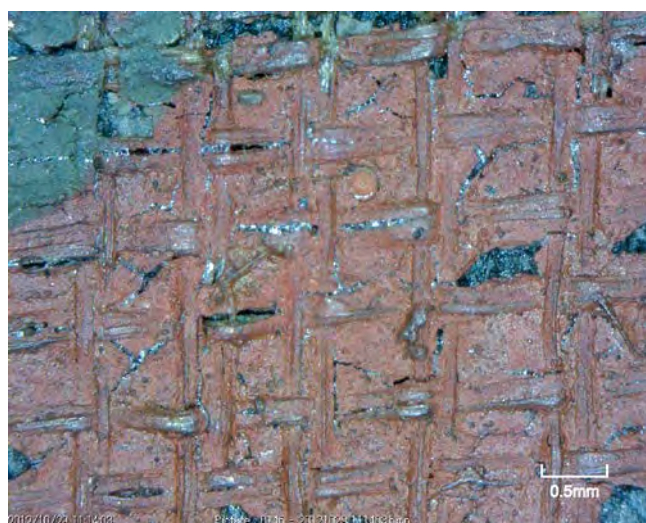
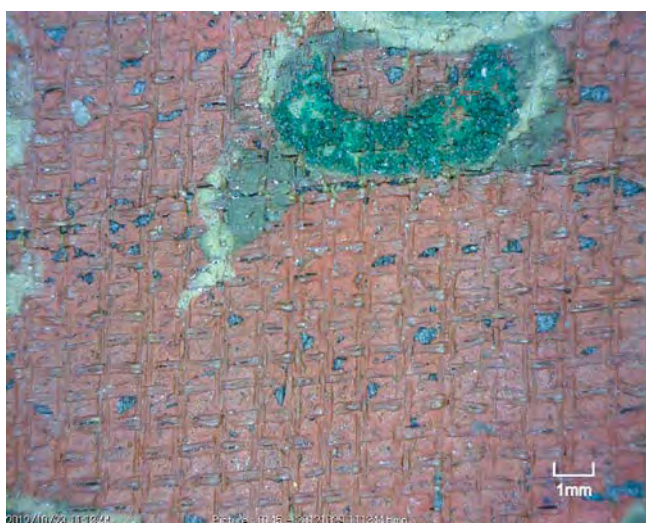


Fig. A.1.4.9 顕微鏡写真 L(9)
Micrographs L(9)

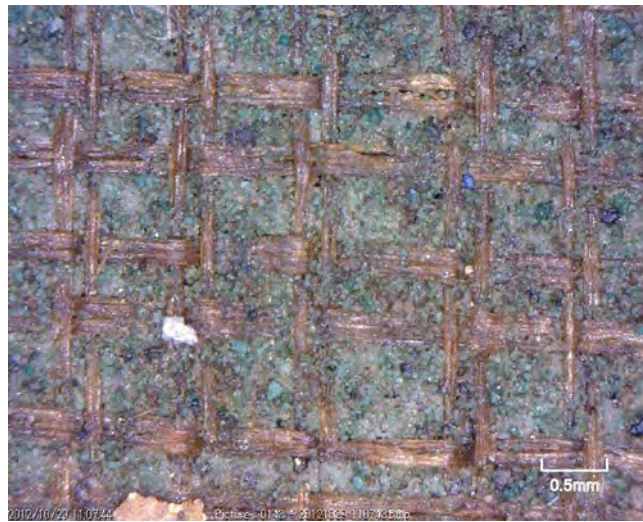


Fig. A.1.4.10 顕微鏡写真 L(10)
Micrographs L(10)

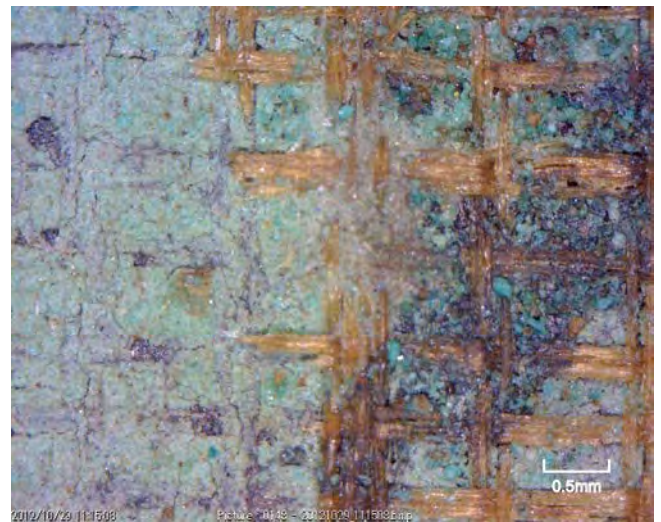
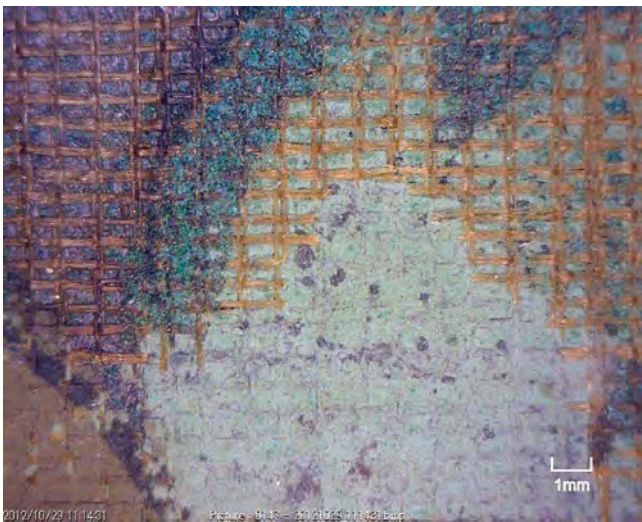


Fig. A.1.4.11 顕微鏡写真 L(11)
Micrographs L(11)

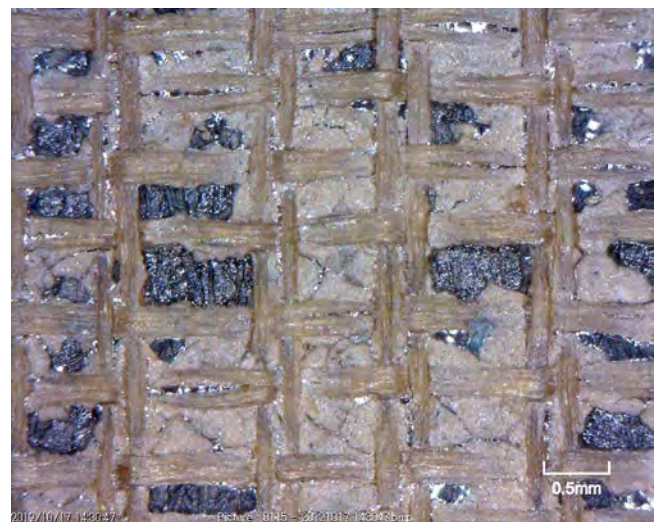
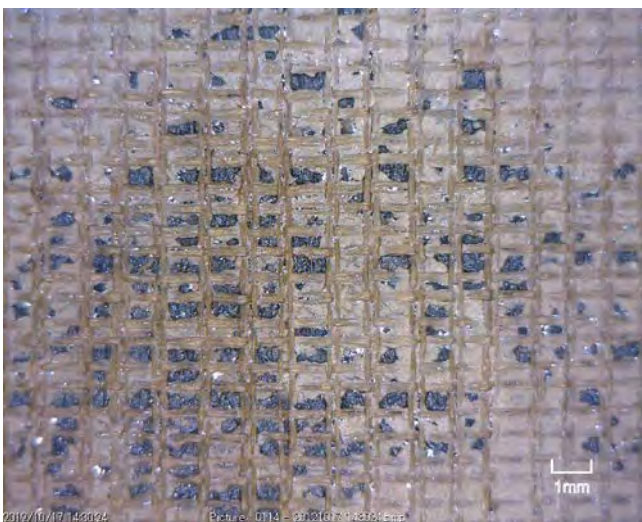


Fig. A.1.4.12 顕微鏡写真 L(12)
Micrographs L(12)

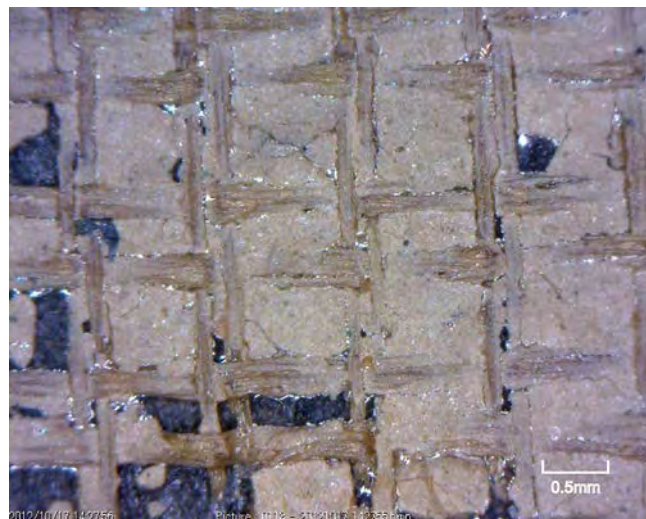
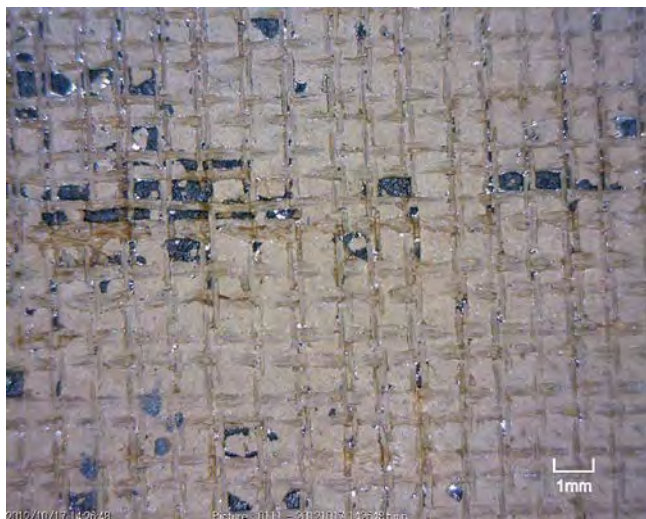


Fig. A.1.4.13 顕微鏡写真 L(13)
Micrographs L(13)

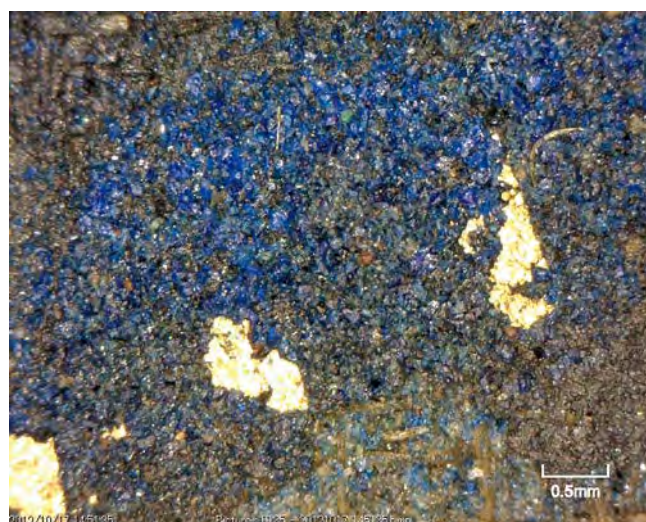
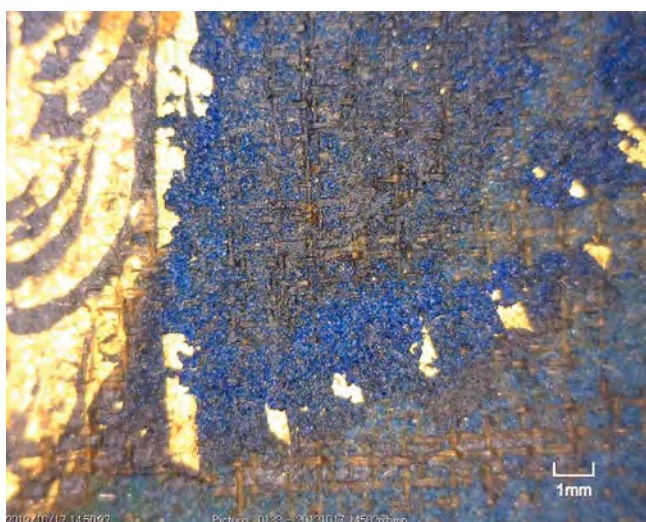


Fig. A.1.4.14 顕微鏡写真 L(14)
Micrographs L(14)

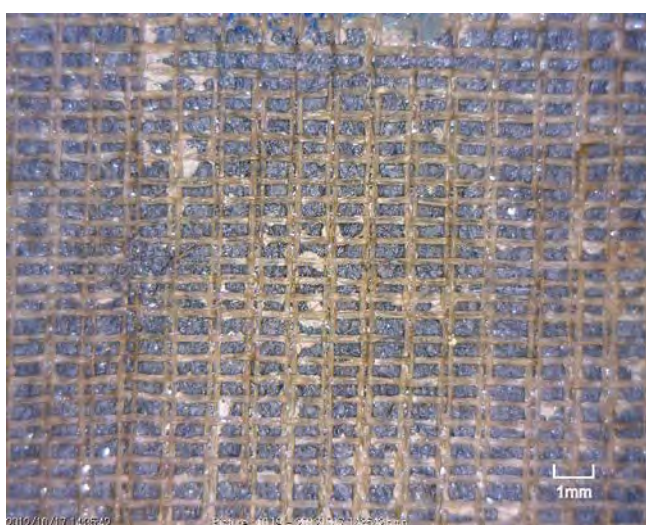


Fig. A.1.4.15 顕微鏡写真 L(15)
Micrographs L(15)

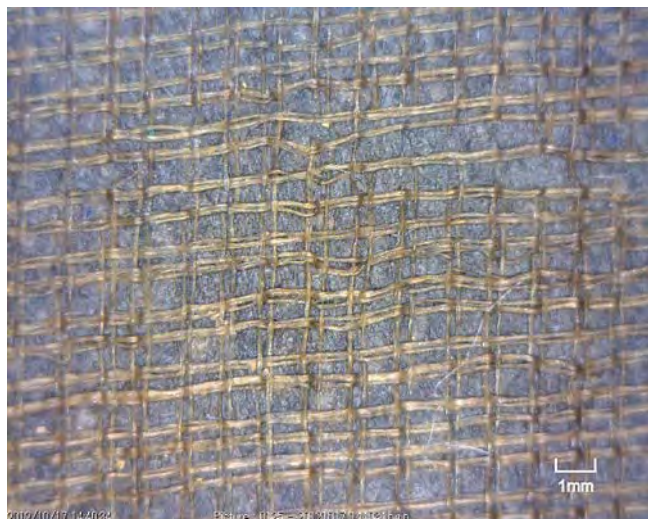


Fig. A.1.4.16 顕微鏡写真 L(16)
Micrographs L(16)

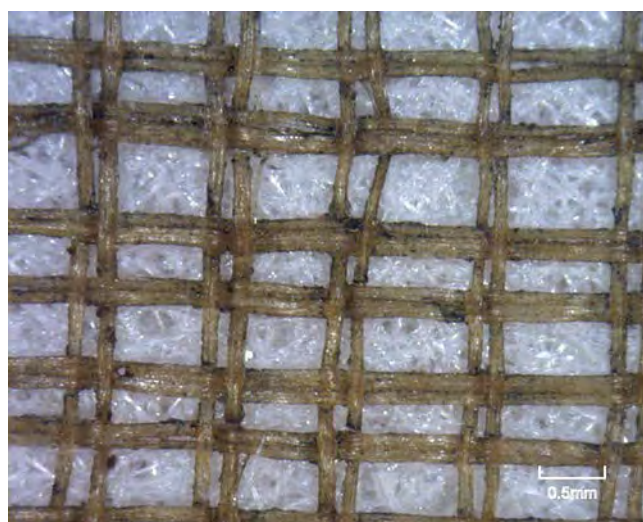
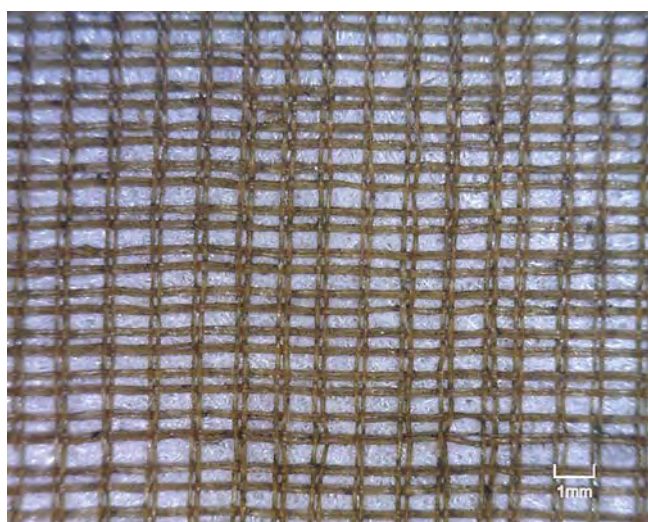


Fig. A.1.4.17 顕微鏡写真 L(17)
Micrographs L(17)

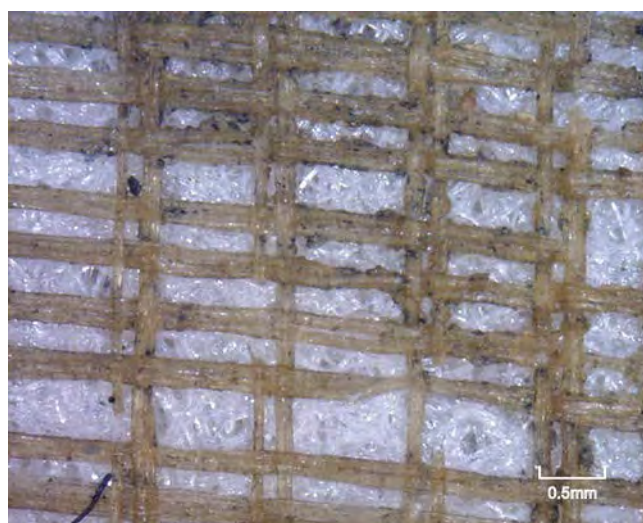
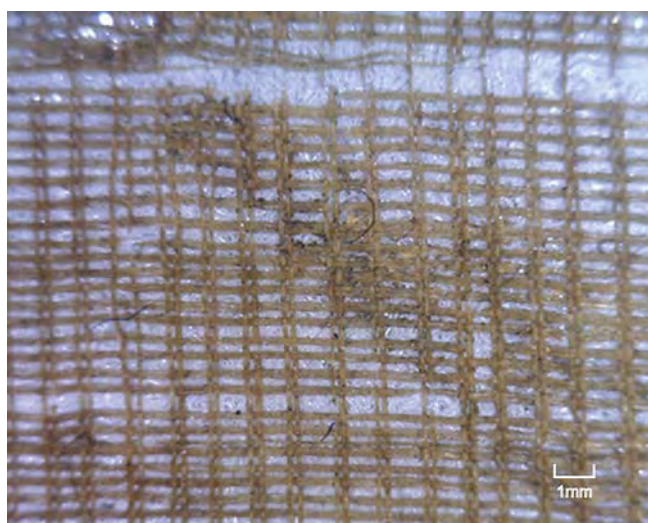


Fig. A.1.4.18 顕微鏡写真 L(18)
Micrographs L(18)

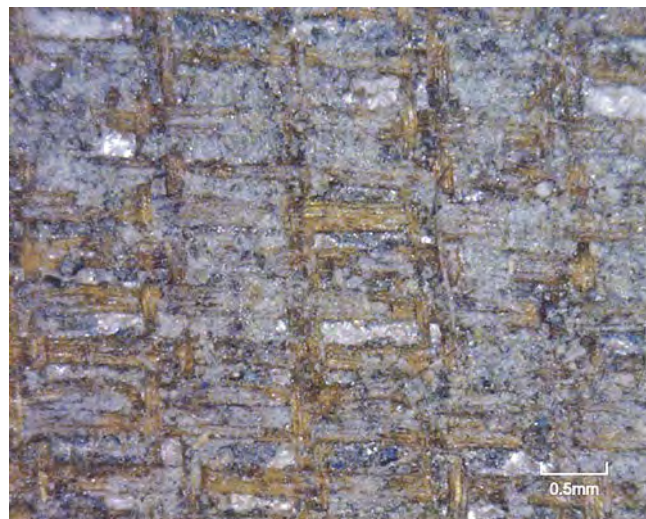
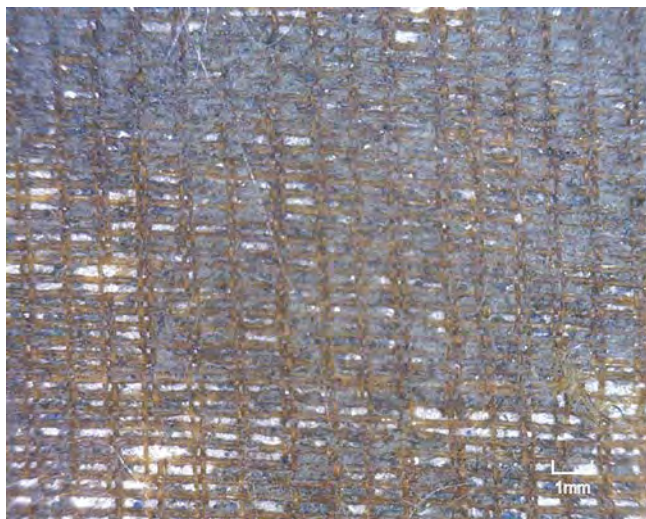


Fig. A.1.4.19 顕微鏡写真 L(19)
Micrographs L(19)

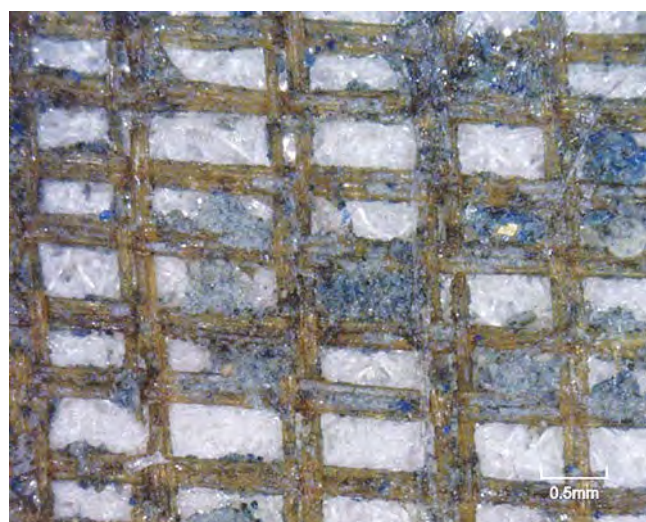
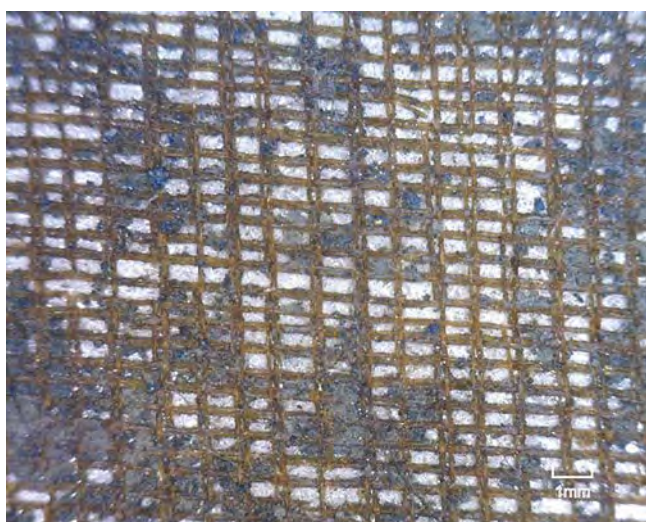


Fig. A.1.4.20 顕微鏡写真 L(20)
Micrographs L(20)

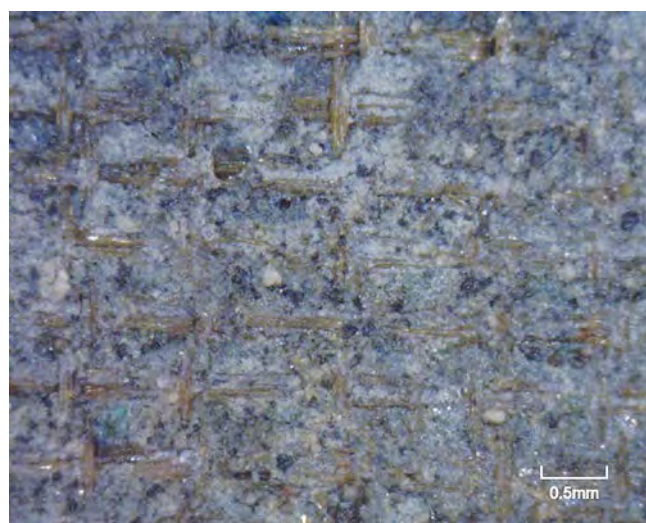
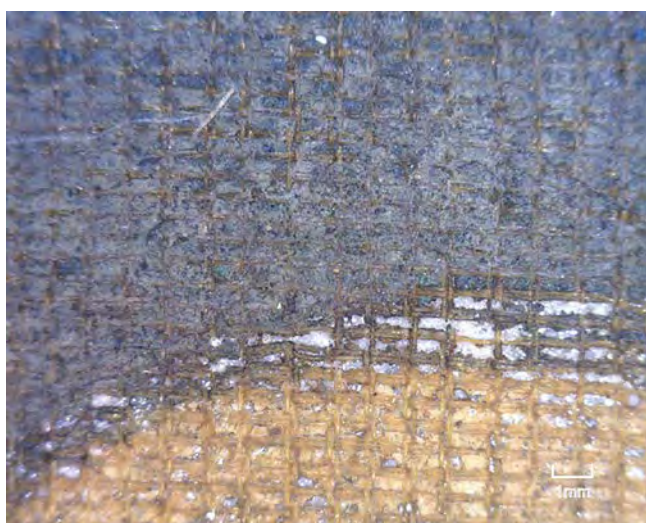


Fig. A.1.4.21 顕微鏡写真 L(21)
Micrographs L(21)

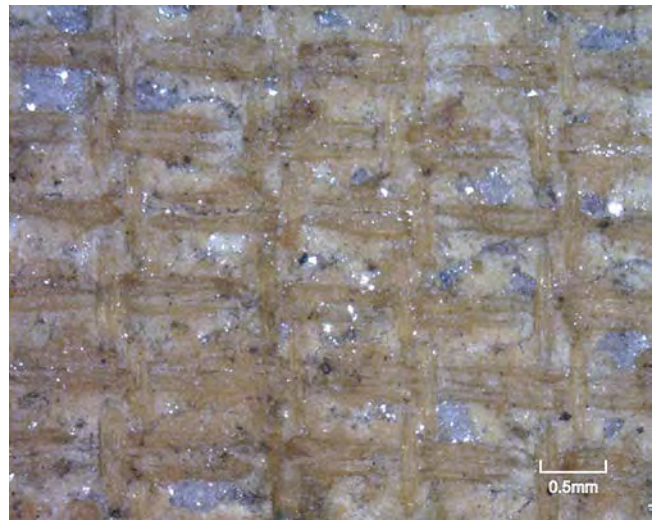
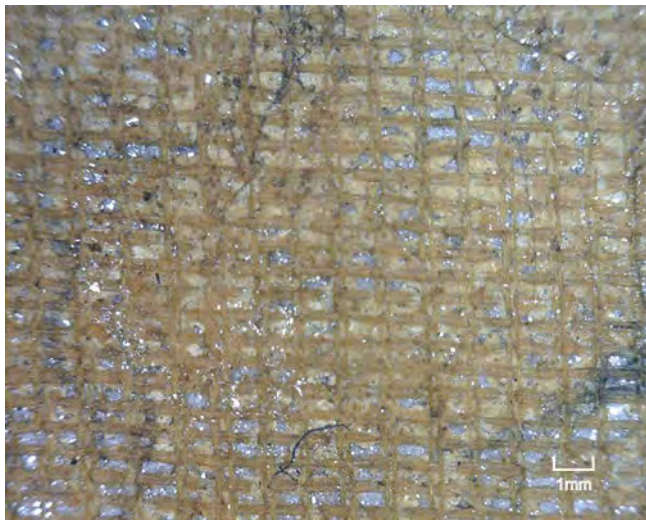


Fig. A.1.4.22 顕微鏡写真 L(22)
Micrographs L(22)

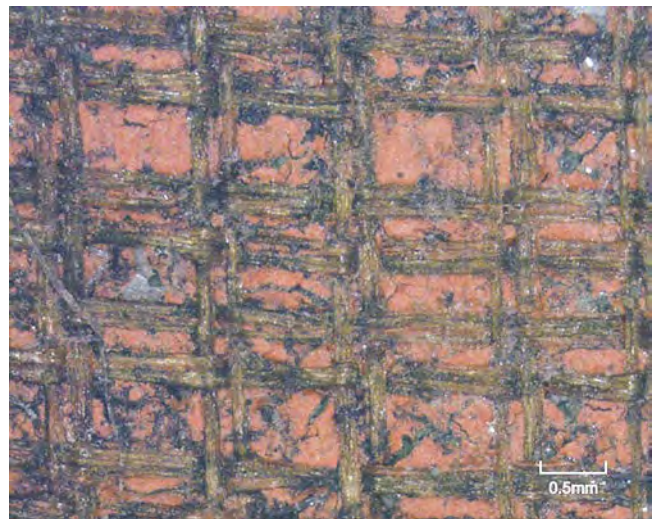
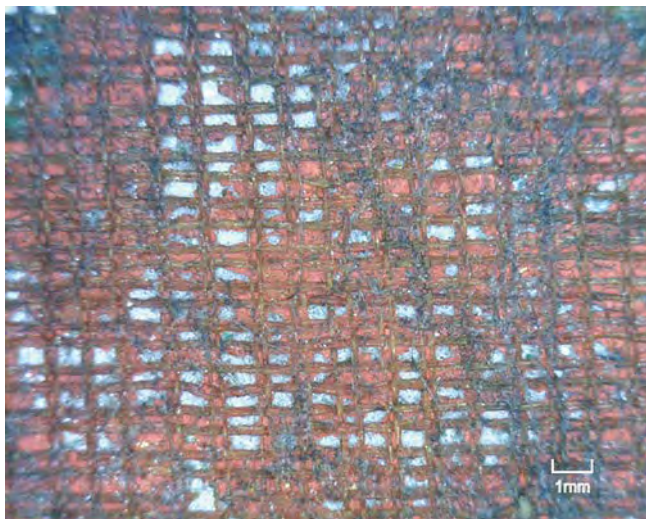


Fig. A.1.4.23 顕微鏡写真 L(23)
Micrographs L(23)

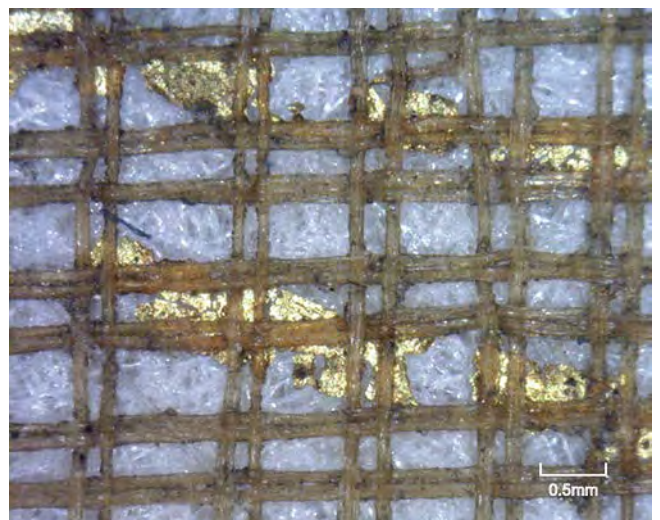
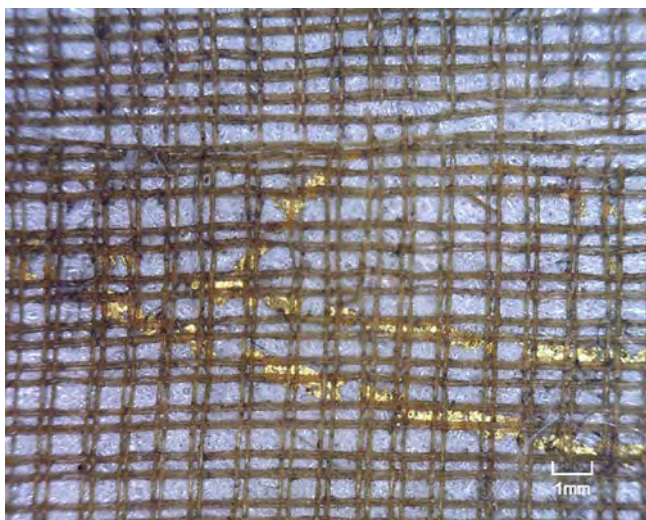


Fig. A.1.4.24 顕微鏡写真 L(24)
Micrographs L(24)

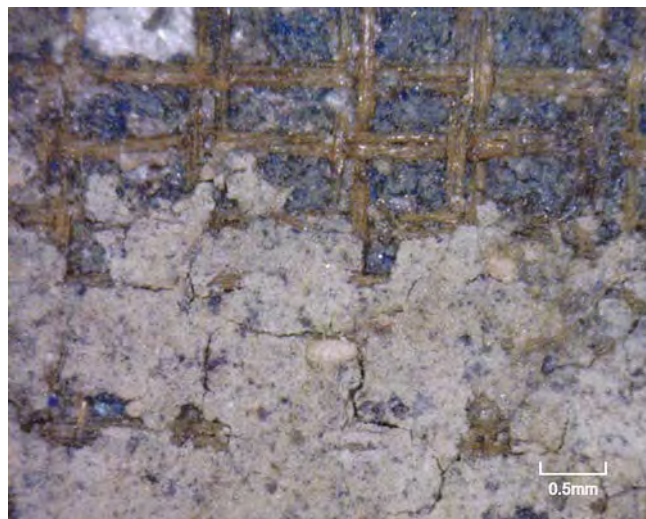
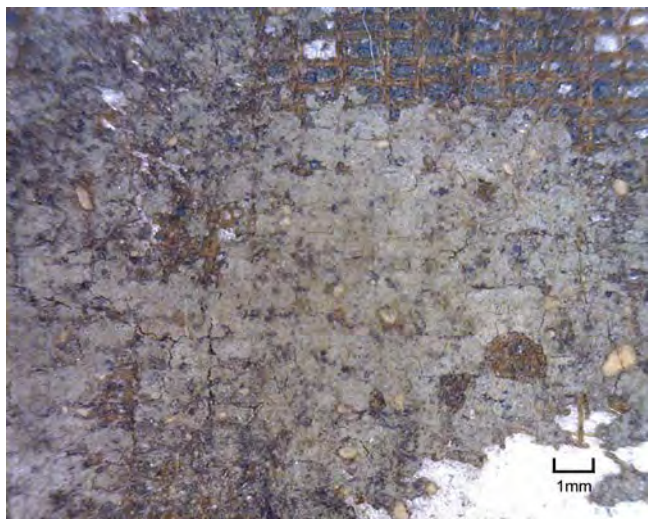


Fig. A.1.4.25 顕微鏡写真 L(25)
Micrographs L(25)

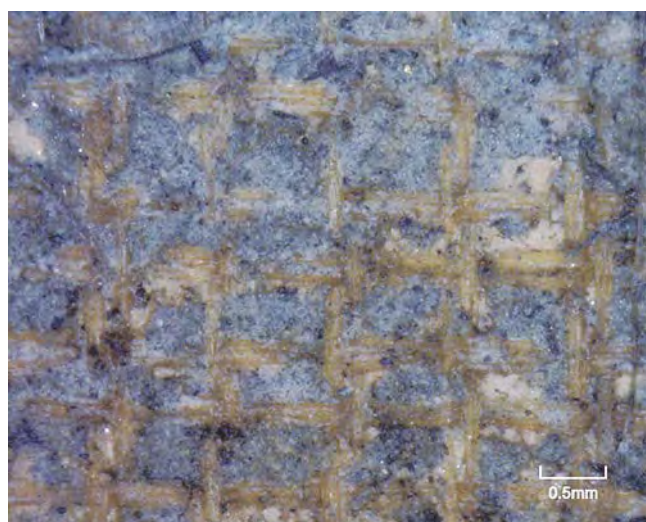
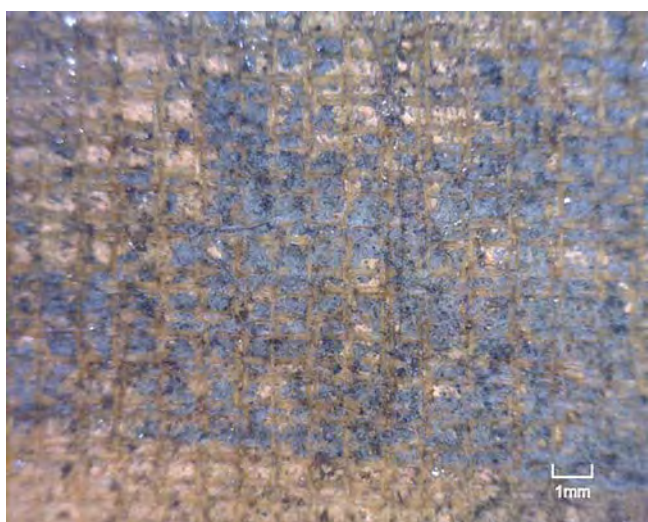


Fig. A.1.4.26 顕微鏡写真 L(26)
Micrographs L(26)

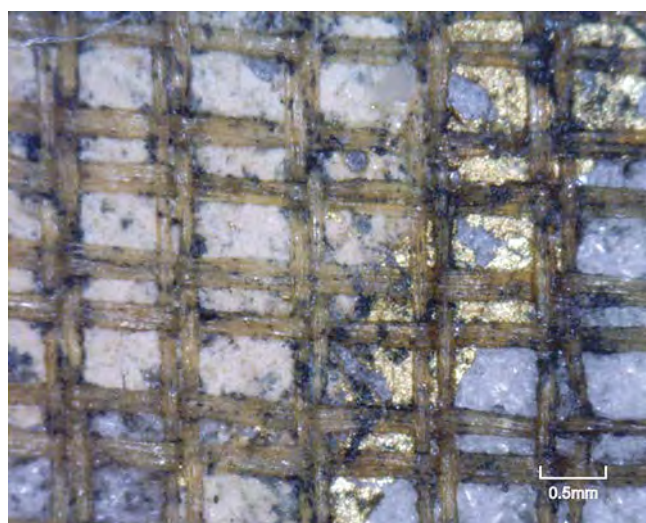
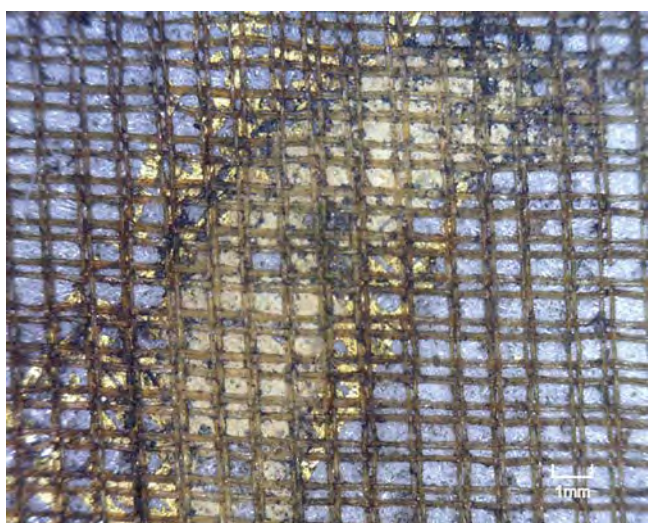


Fig. A.1.4.27 顕微鏡写真 L(27)
Micrographs L(27)

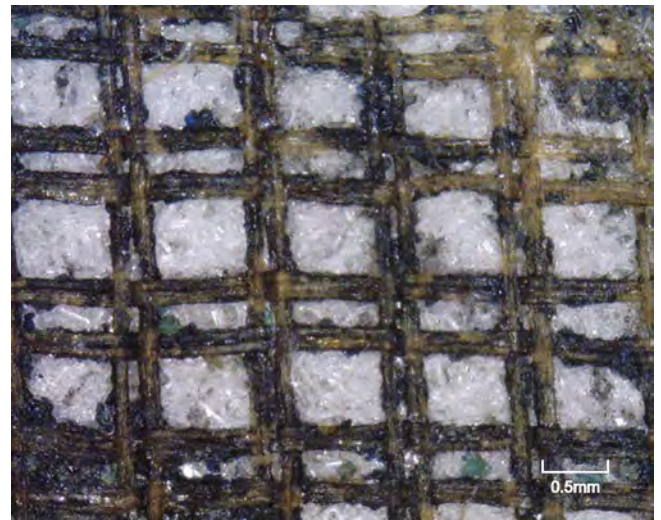
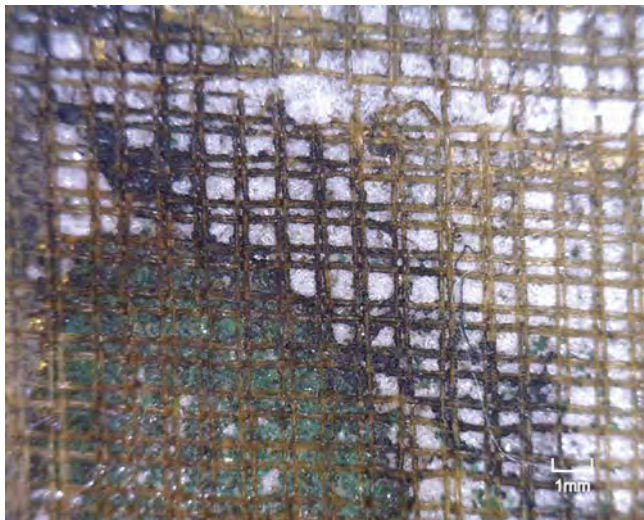


Fig. A.1.4.28 顕微鏡写真 L(28)
Micrographs L(28)

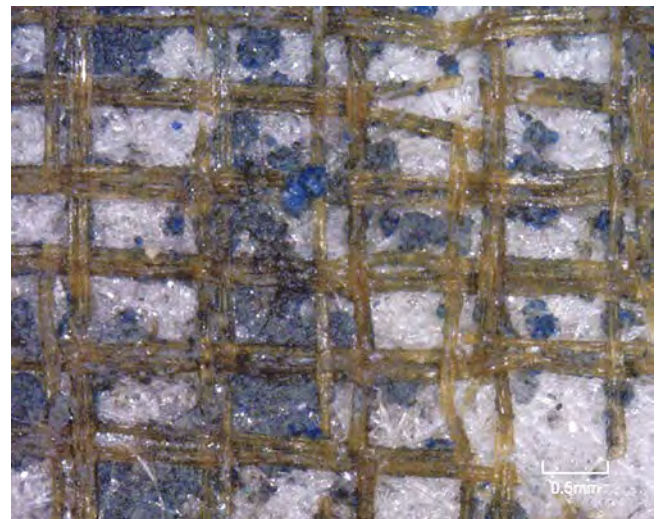
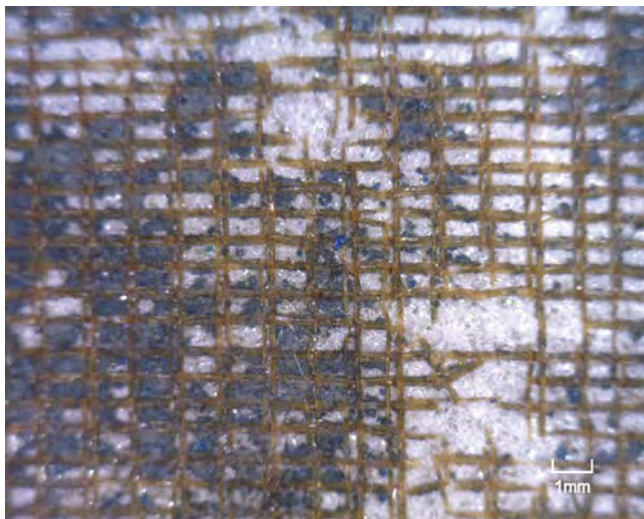


Fig. A.1.4.29 顕微鏡写真 L(29)
Micrographs L(29)

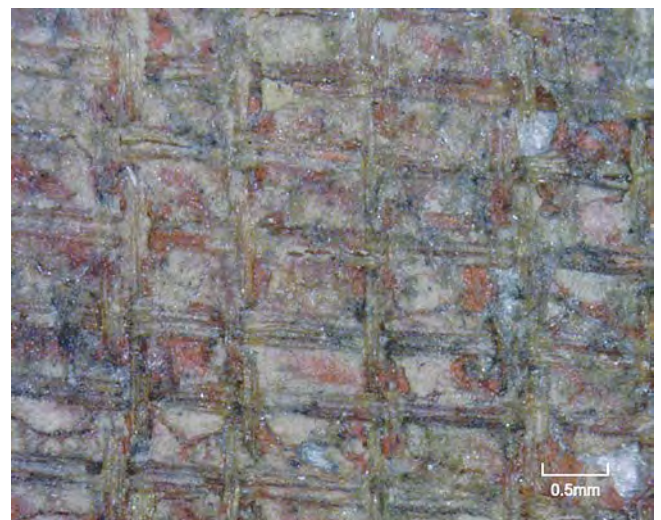


Fig. A.1.4.30 顕微鏡写真 L(30)
Micrographs L(30)

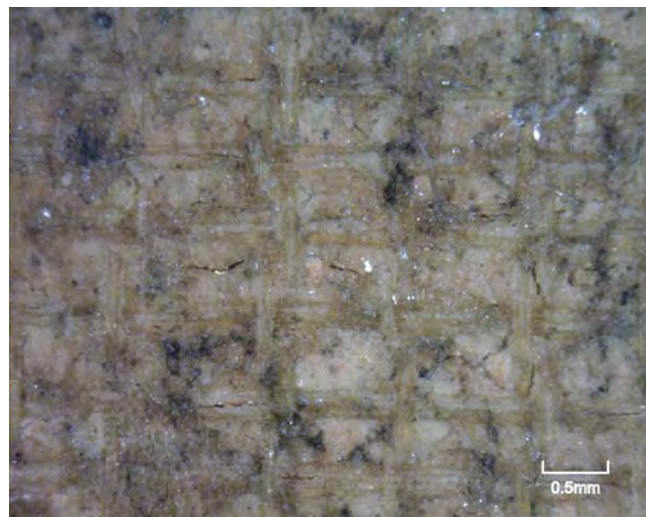
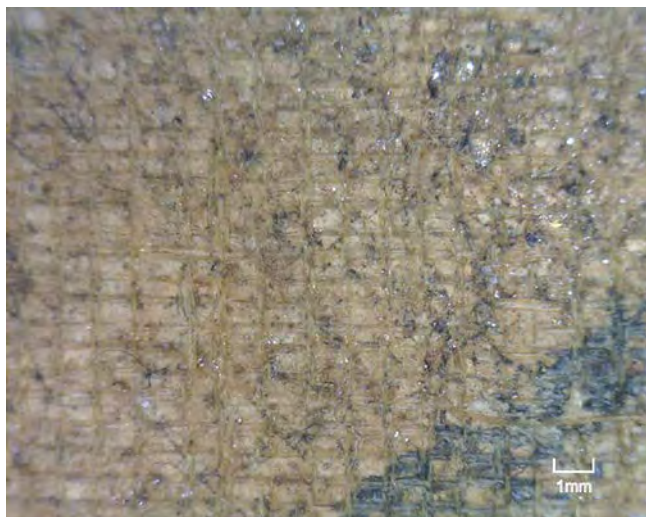


Fig. A.1.4.31 顕微鏡写真 L(31)
Micrographs L(31)

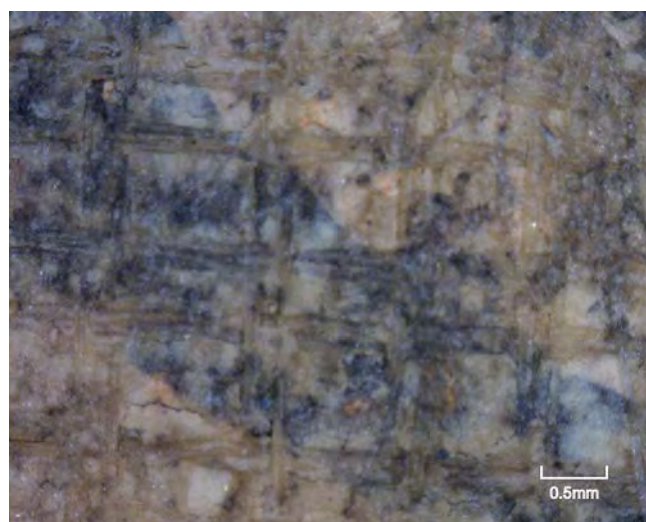
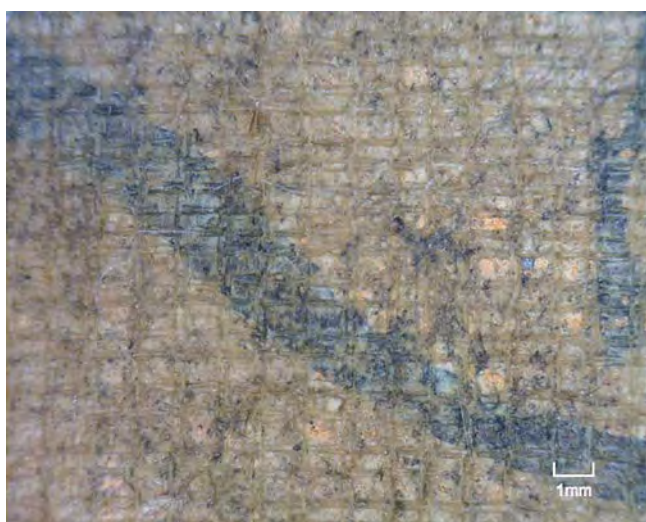


Fig. A.1.4.32 顕微鏡写真 L(32)
Micrographs L(32)

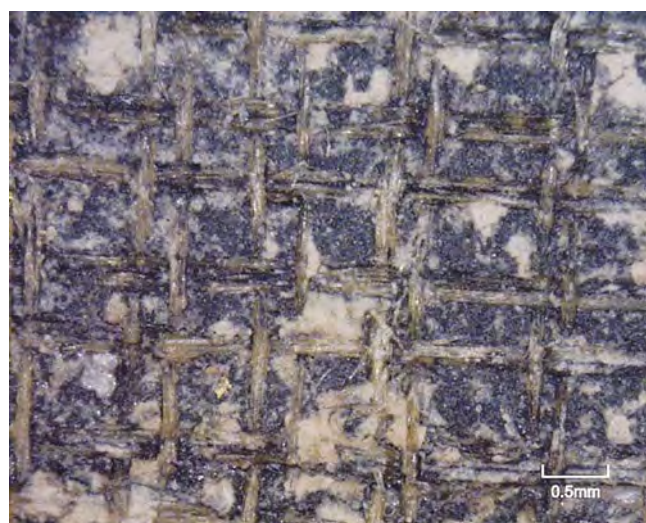
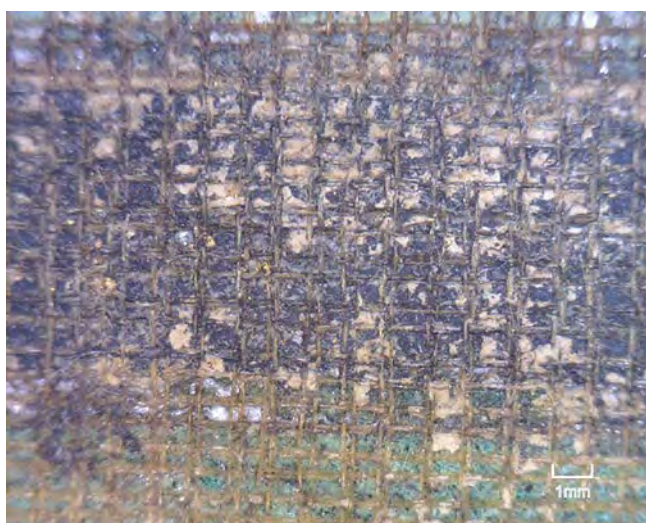


Fig. A.1.4.33 顕微鏡写真 L(33)
Micrographs L(33)

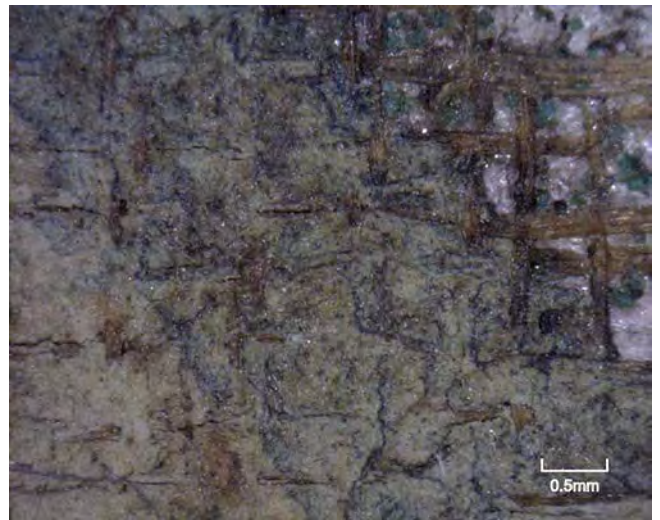
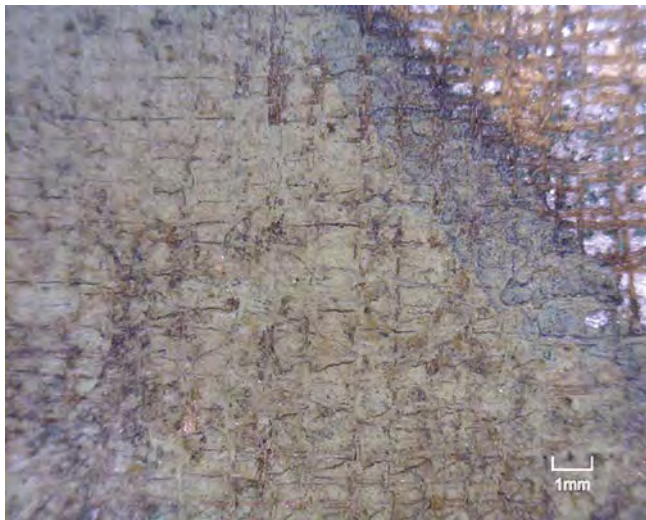


Fig. A.1.4.34 顕微鏡写真 L(34)
Micrographs L(34)

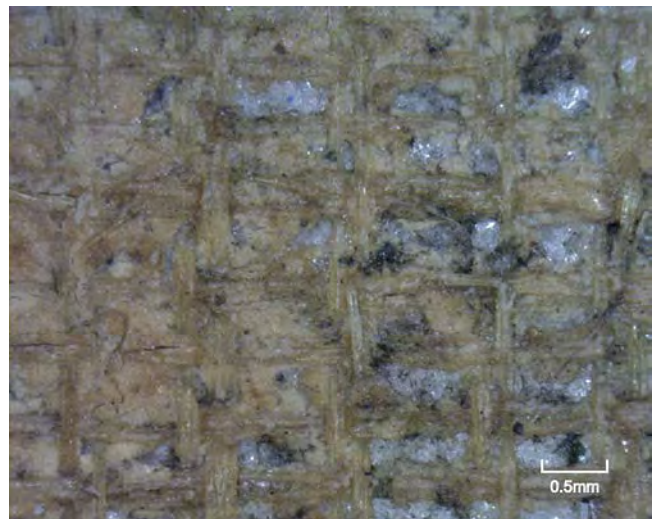
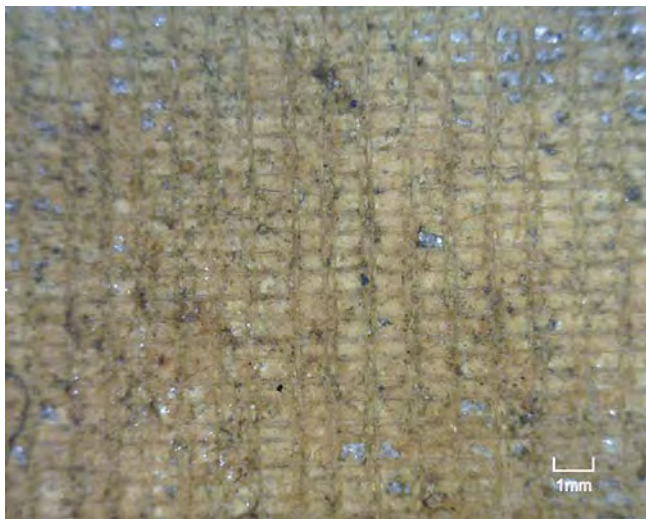


Fig. A.1.4.35 顕微鏡写真 L(35)
Micrographs L(35)

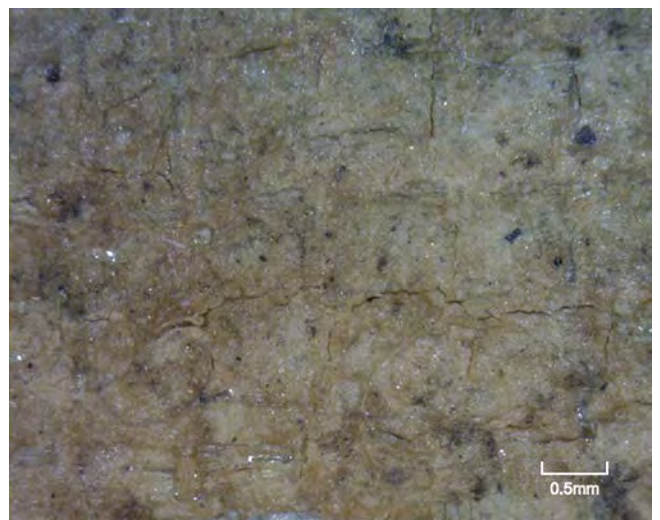
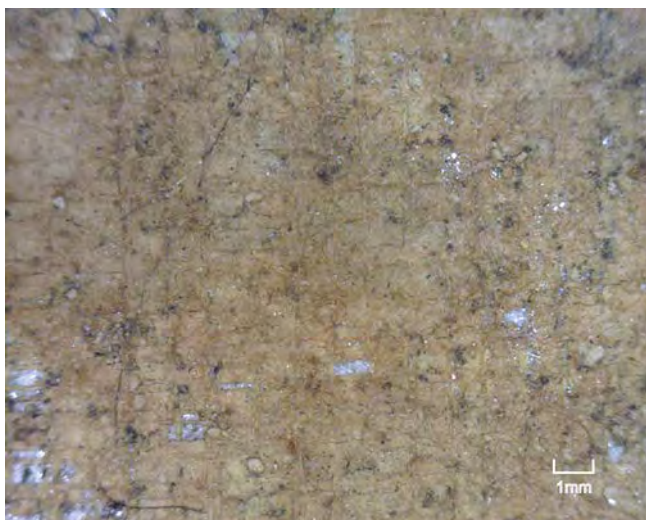


Fig. A.1.4.36 顕微鏡写真 L(36)
Micrographs L(36)

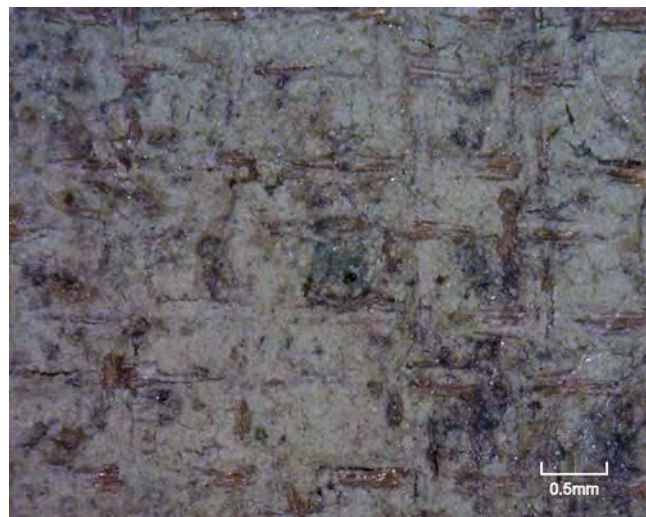
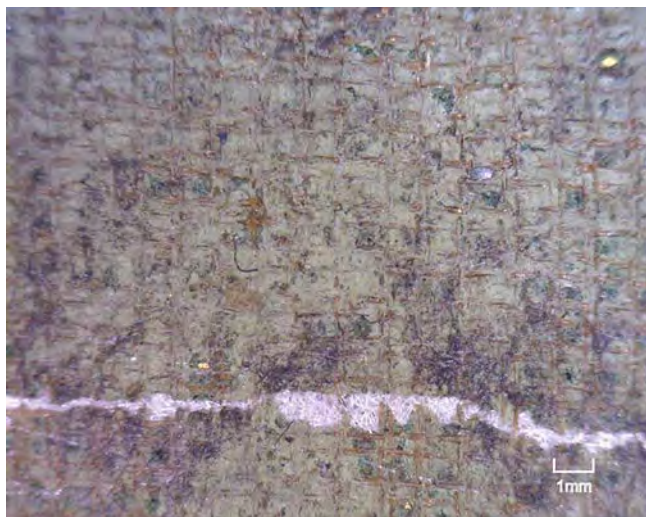


Fig. A.1.4.37 顕微鏡写真 L(37)
Micrographs L(37)

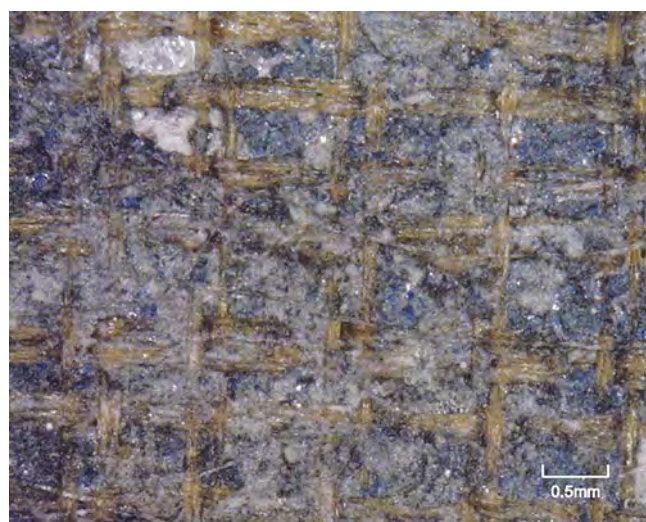
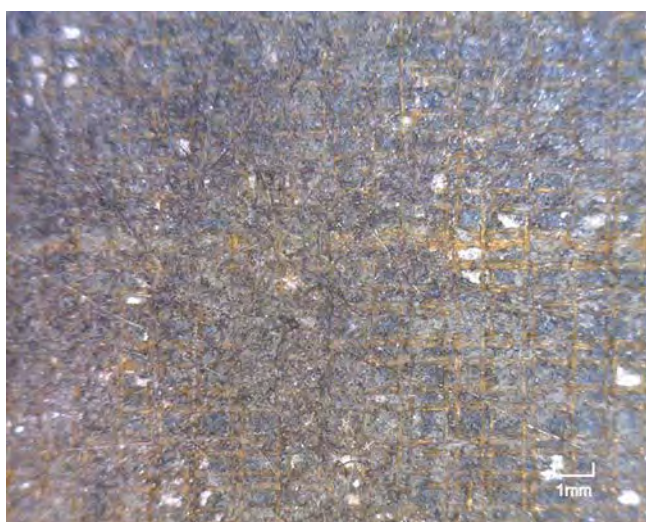


Fig. A.1.4.38 顕微鏡写真 L(38)
Micrographs L(38)

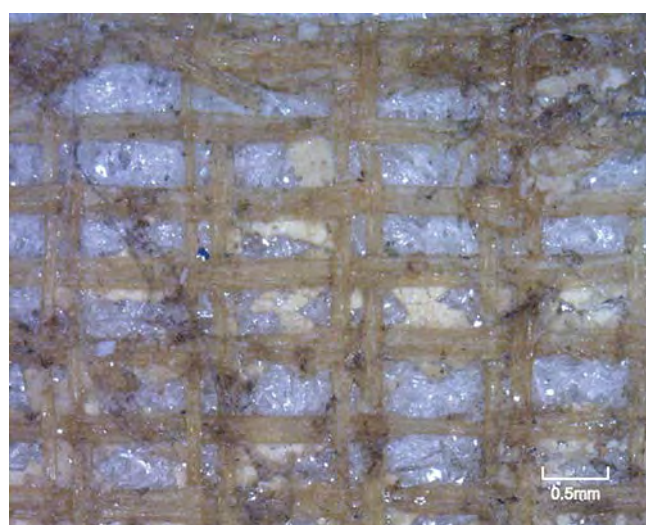
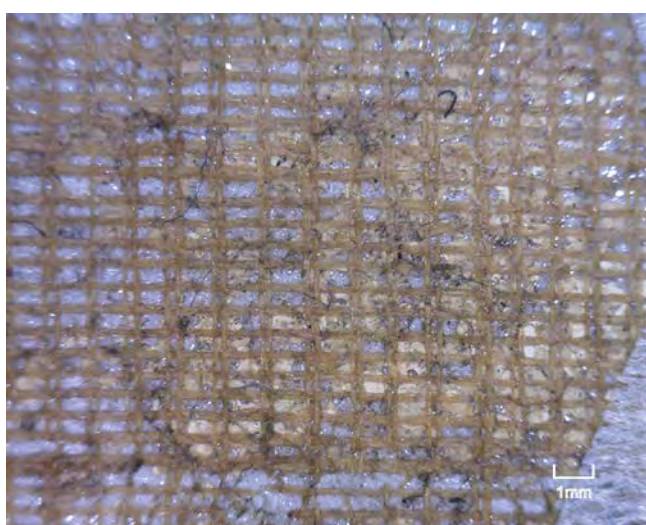


Fig. A.1.4.39 顕微鏡写真 L(39)
Micrographs L(39)

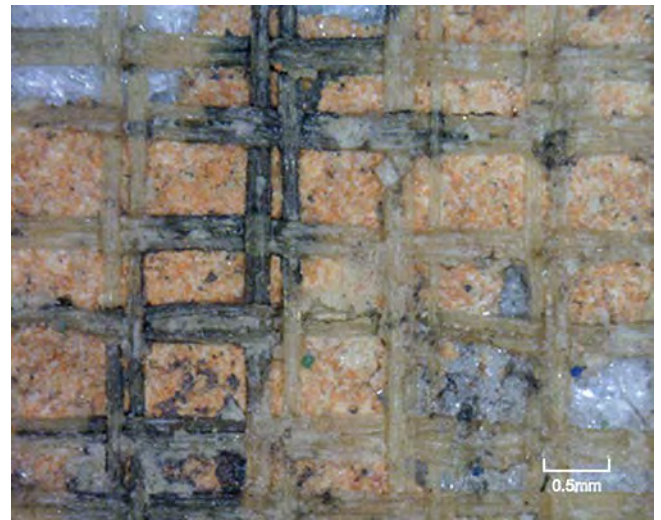
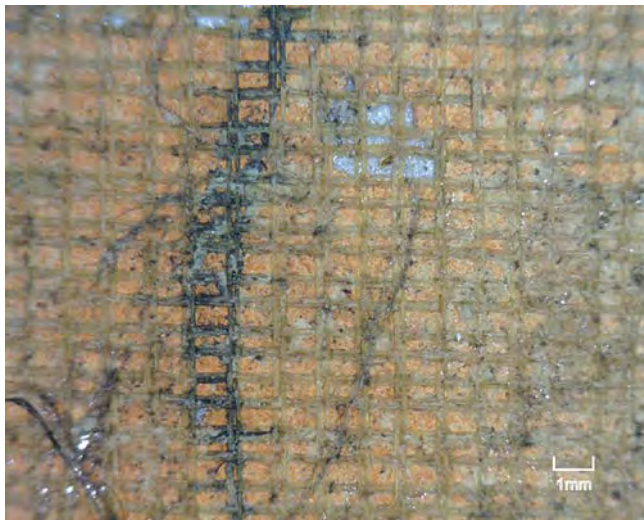


Fig. A.1.4.40 顕微鏡写真 L(40)
Micrographs L(40)

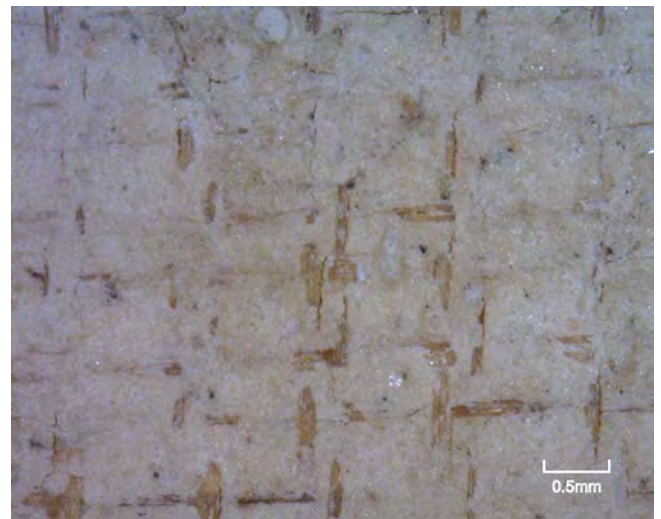
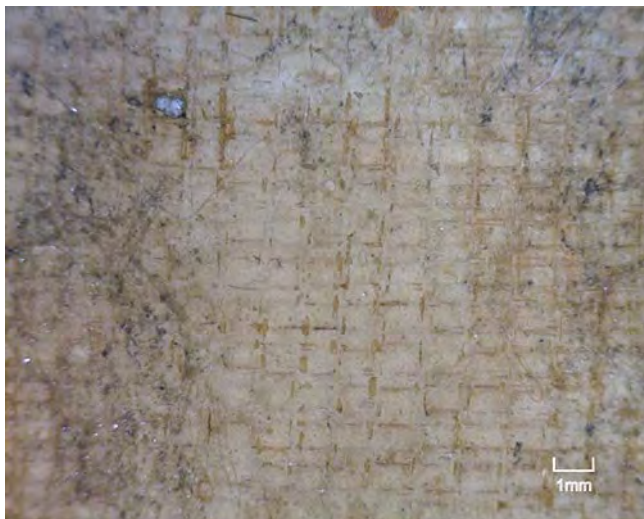


Fig. A.1.4.41 顕微鏡写真 L(41)
Micrographs L(41)

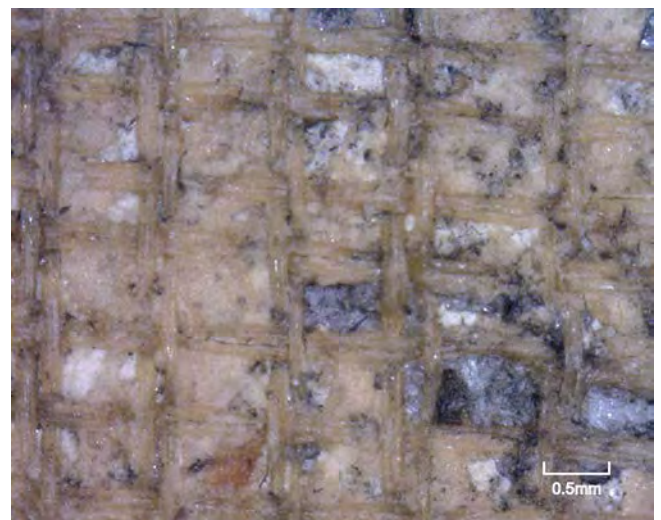
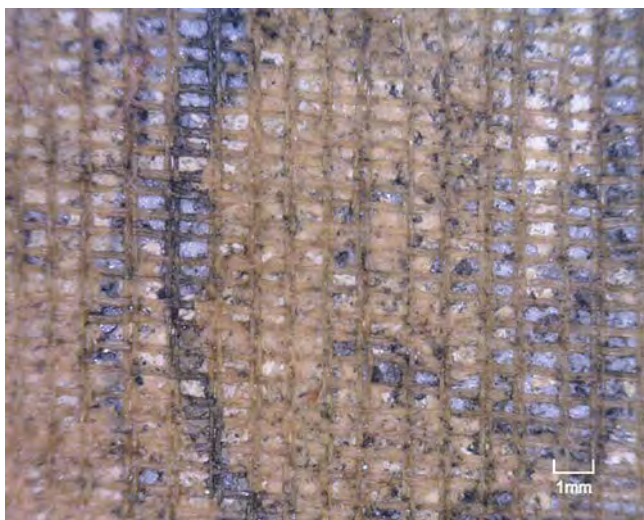


Fig. A.1.4.42 顕微鏡写真 L(42)
Micrographs L(42)

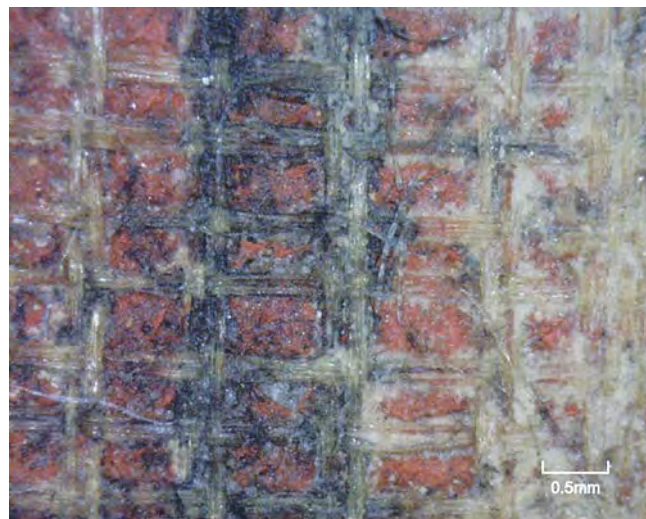
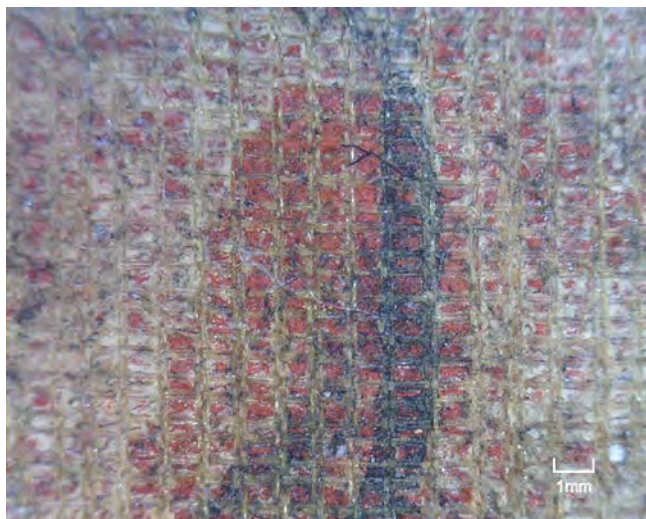


Fig. A.1.4.43 顕微鏡写真 L(43)
Micrographs L(43)

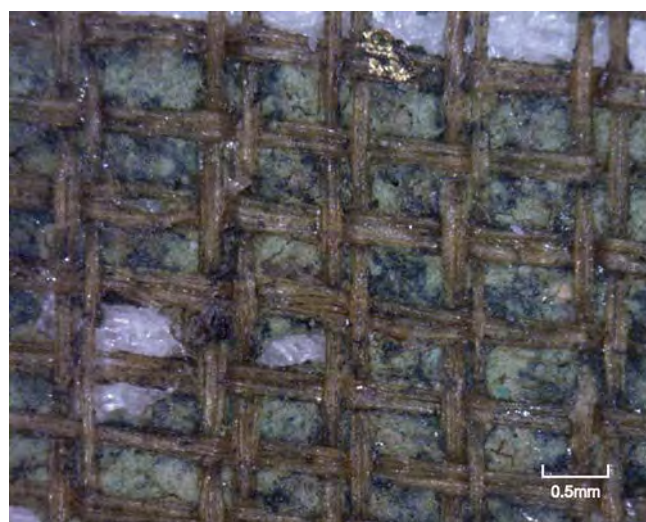
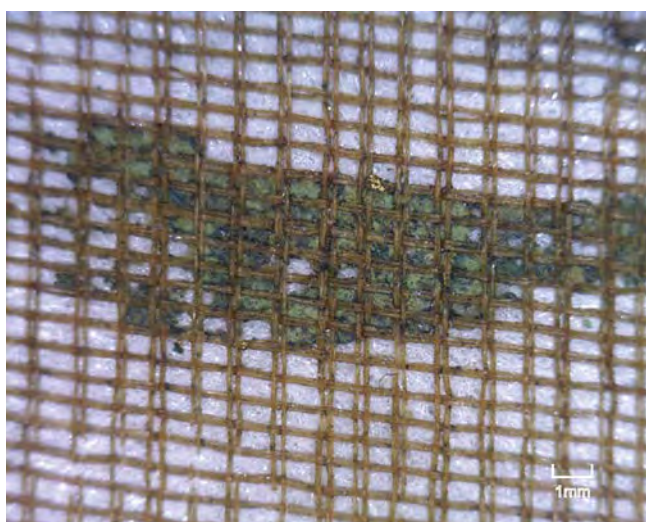


Fig. A.1.4.44 顕微鏡写真 L(44)
Micrographs L(44)

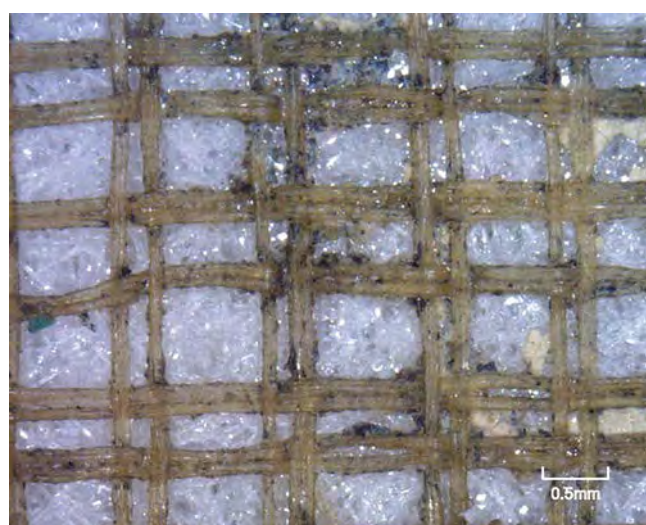
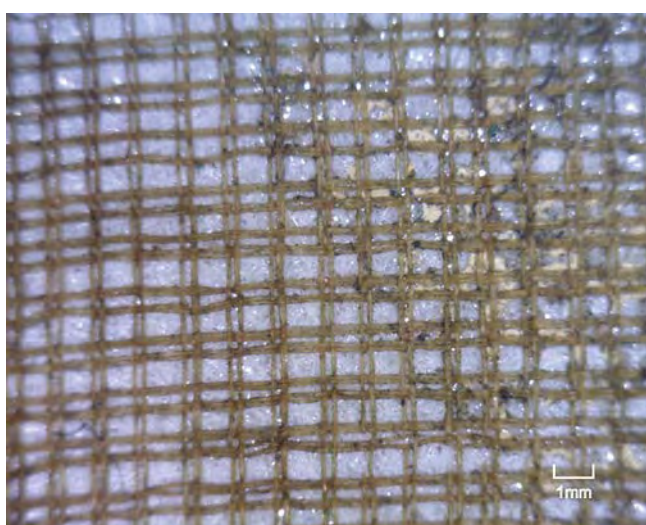


Fig. A.1.4.45 顕微鏡写真 L(45)
Micrographs L(45)

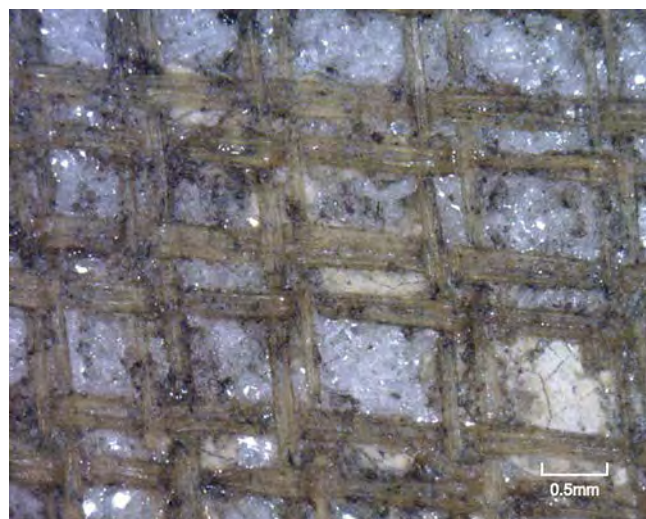
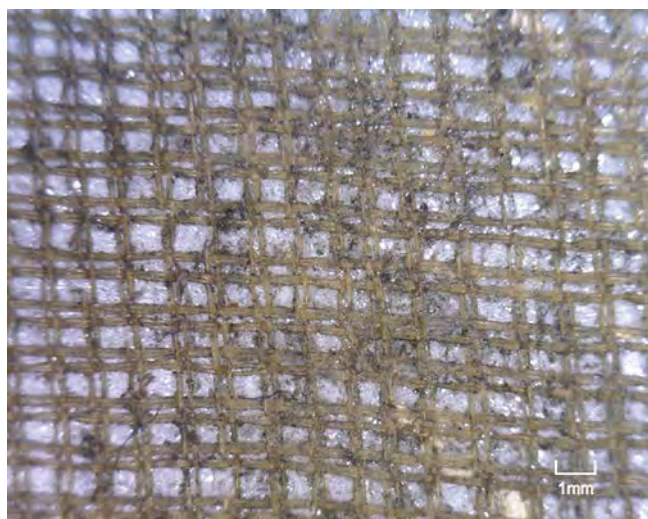


Fig. A.1.4.46 顕微鏡写真 L(46)

Micrographs L(46)



(a)



(b)

Fig. A.1.5.1 可視光線写真（反射光）肌裏紙除去後裏面 (a) 左幅 (b) 右幅
Visible light photographs, back side of the artwork after removal of the first lining paper
(a) left scroll (b) right scroll

ピクセル数	6132×8176
画像フォーマット	Tiff
Image size	6132×8176
Image format	Tiff



(a)



(b)

Fig. A.1.5.2 近赤外線写真（反射光）肌裏紙除去後裏面 (a) 左幅 (b) 右幅
Near infrared photographs, back side of the artwork after removal of the first lining paper
(a) left scroll (b) right scroll

イメージセンサー	フルフレーム CCD (モノクローム E7、メガビジョン)
ピクセル数	感度領域 ; 800-1100 nm
画像フォーマット	800-1100 nm
	Tiff
Image sensor	Full Frame CCD (Monochrome E7, Mega Vision)
Image size	Sensitivity; 800-1100 nm
Image format	6132×8176
	Tiff



(a)



(b)

Fig. A.1.5.3 近赤外線写真（透過光）肌裏紙除去後 (a) 左幅裏面 (b) 右幅
Near infrared photographs (transmitted light), after removal of the first lining paper
(a) left scroll, back side (b) right scroll

イメージセンサー	フルフレーム CCD (モノクローム E7、メガビジョン)
ピクセル数	感度領域; 800-1100 nm
画像フォーマット	800-1100 nm
	Tiff
Image sensor	Full Frame CCD (Monochrome E7, Mega Vision)
Image size	Sensitivity; 800-1100 nm
Image format	6132×8176
	Tiff



(a)



(b)

Fig. A.1.5.4 可視光線写真（反射光）肌裏紙除去後裏面 (a) 右幅部分 1 (b) 右幅部分 2

Visible light photographs, after removal of the first lining paper, back side

(a) part of the right scroll 1 (b) part of the right scroll 2



(a)



(b)

Fig. A.1.5.5 近赤外線写真（反射光）肌裏紙除去後裏面 (a) 右幅部分 1 (b) 右幅部分 2

Near infrared photographs, after removal of the first lining paper, back side

(a) part of the right scroll 1 (b) part of the right scroll 2



(a)



(b)

Fig. A.1.5.6 近赤外線写真（透過光）肌裏紙除去後 (a) 右幅部分 1 (b) 右幅部分 2

Near infrared photographs (transmitted light), after removal of the first lining paper

(a) part of the right scroll 1 (b) part of the right scroll 2



(a)



(b)

Fig. A.1.6 本修復で処置を施した箇所（補填及び補彩を施した箇所） (a)左幅 (b)右幅
Places infilling and inpainting (a) left scroll (b) right scroll

付録 2. 蛍光 X 線分析

Appendix 2. X-ray fluorescence analysis

測定者；藤澤明

分析装置；携帯型蛍光 X 線分析装置

241Am 密封環状放射線源 (AMRB8774、AET technology)

小型 X 線検出器 (XR-100CR-0.5-BE-S、AMPTEX)

小型マルチチャンネルアナライザ (MCA8000A、AMPTEX)

プリアンプ (PX2CR、AMPTEX)

パーソナルコンピュータ

測定時間；500 秒

装置ヘッド～試料間距離；約 5mm

測定径；約 10mm

測定位置；Fig. A.2.1 参照

Measurer; Akira Fujisawa

Analyzer; A portable x-ray fluorescence analyzer consisting of:

a 241Am sealing circular radiation source (AMRB8774, AET technology),

an X-ray detector (XR-100CR-0.5-BE-S, AMPTEX),

a multichannel analyzer (MCA8000A, AMPTEX),

a preamplifier (PX2CR, AMPTEX)

and a personal computer.

Measuring time; 500 seconds

Distance between the apparatus and the artwork; approximately 5 mm

Measuring area; approximately 10 mm

Measuring points; refer to Fig. A.2.1



(a)



(b)

Fig. A.2.1 測定位置 右幅 (a)表面 (b)裏面
Measuring points, right scroll (a) front side (b) back side

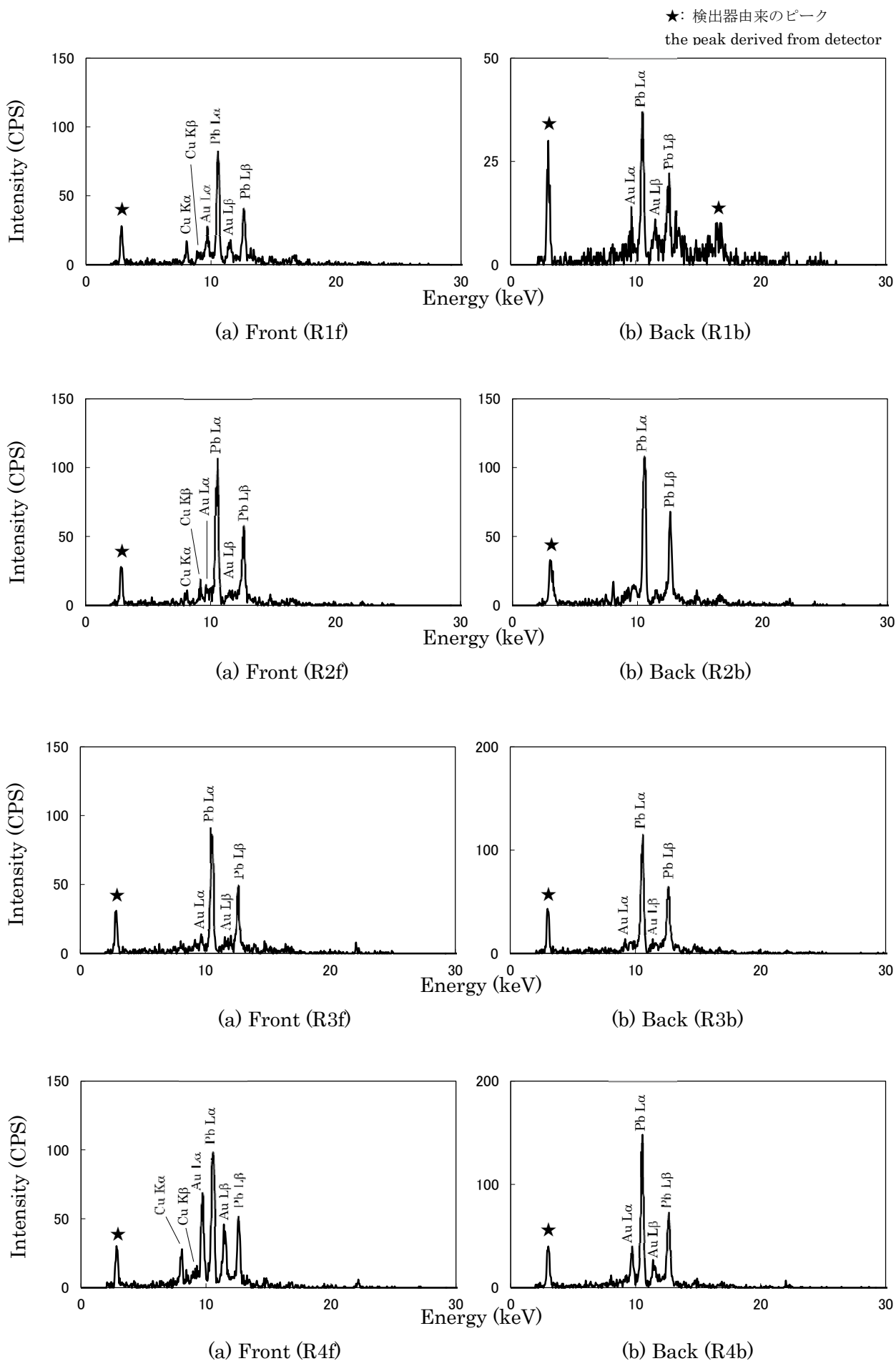
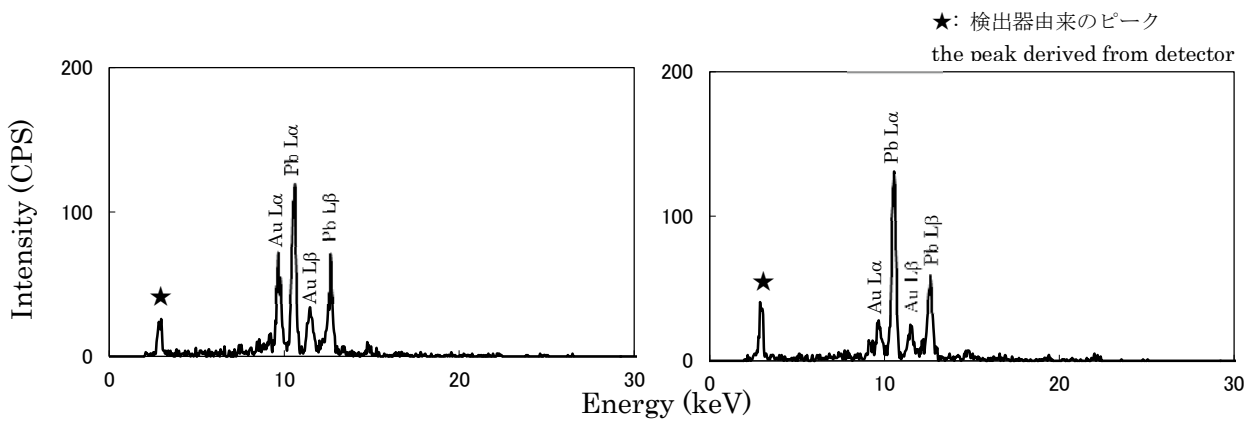
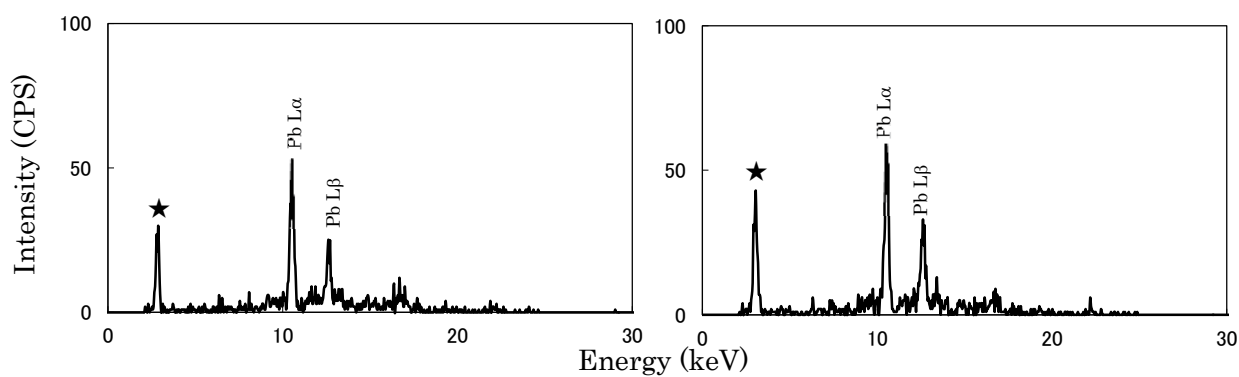


Fig. A.2.2 蛍光 X 線スペクトル (R1~4)
X-ray spectra (R1-4)



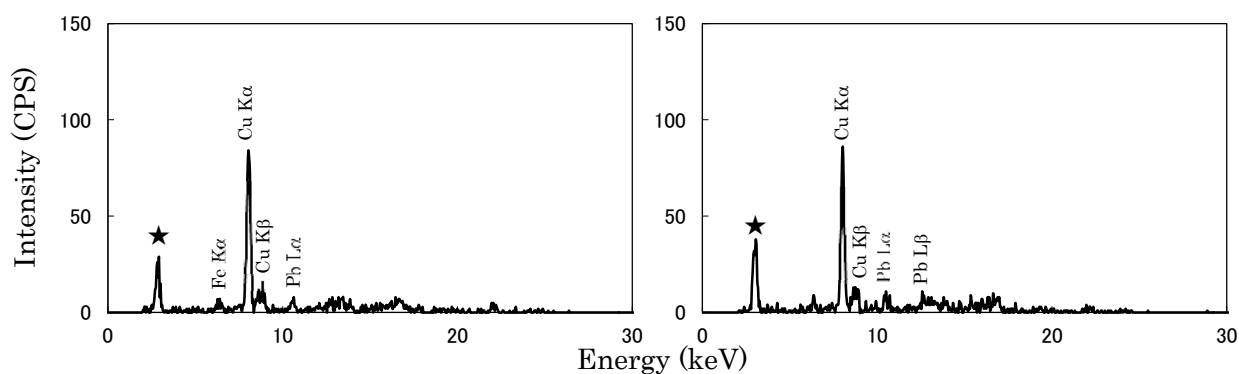
(a) Front (R5f)

(b) Back (R5b)



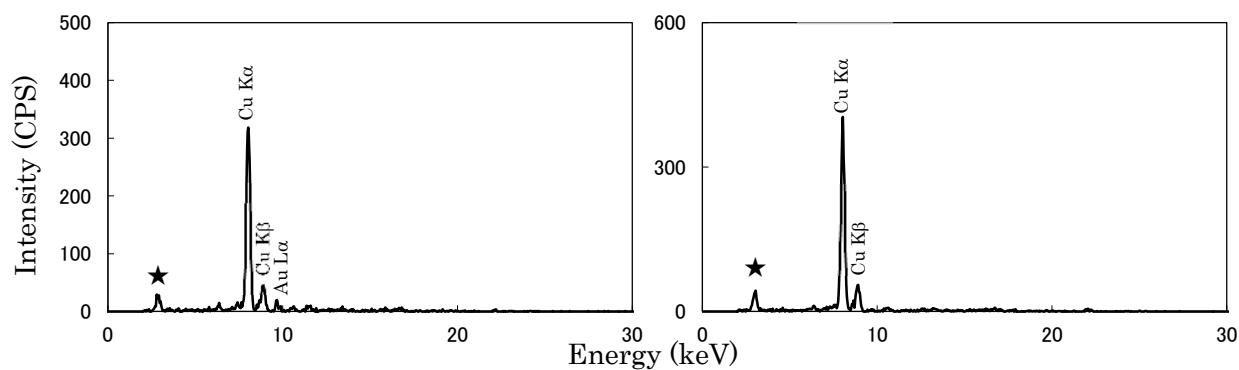
(a) Front (R6f)

(b) Back (R6b)



(a) Front (R7f)

(b) Back (R7b)



(a) Front (R8f)

(b) Back (R8b)

Fig. A.2.3 蛍光 X 線スペクトル (R5～8)

X-ray spectra (R5-8)

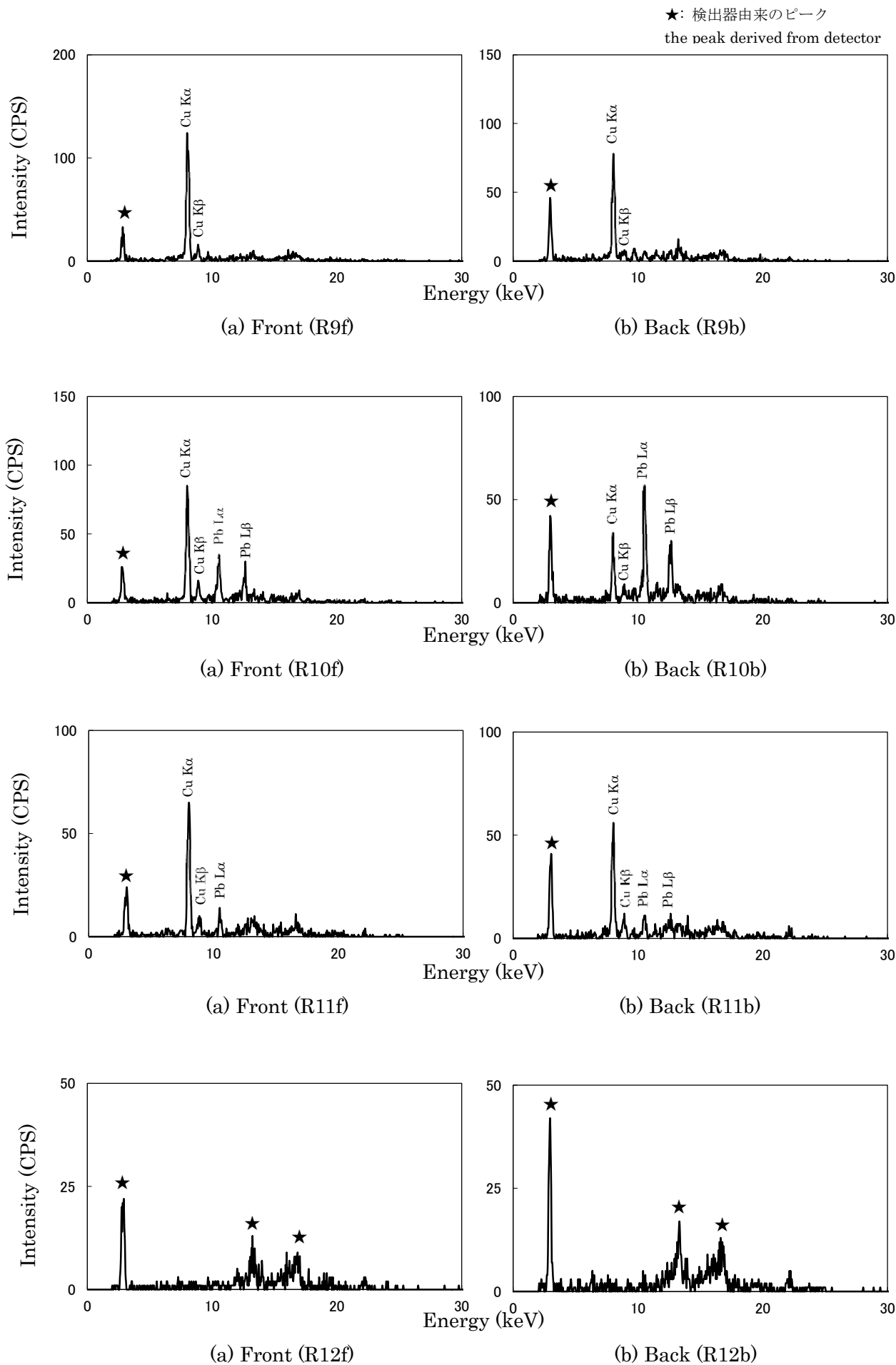
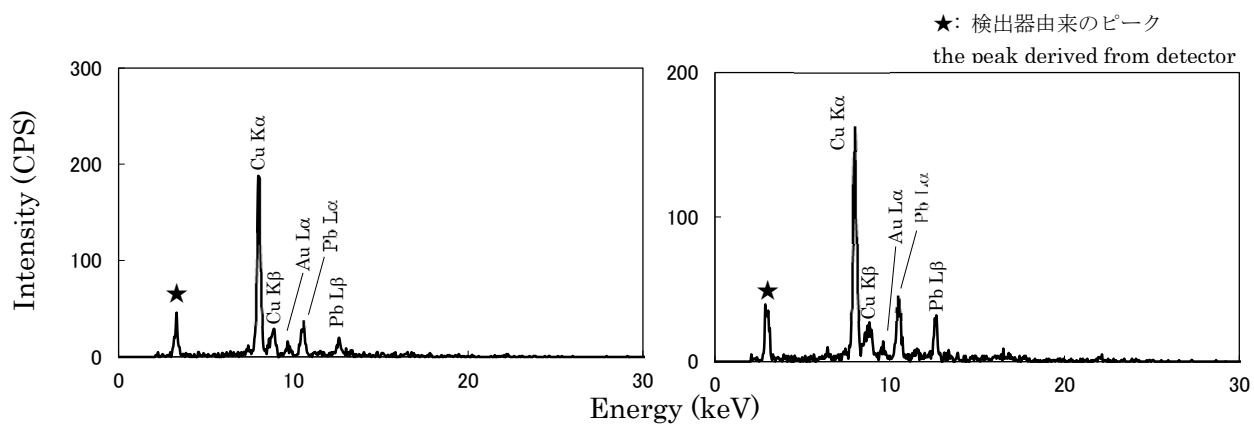


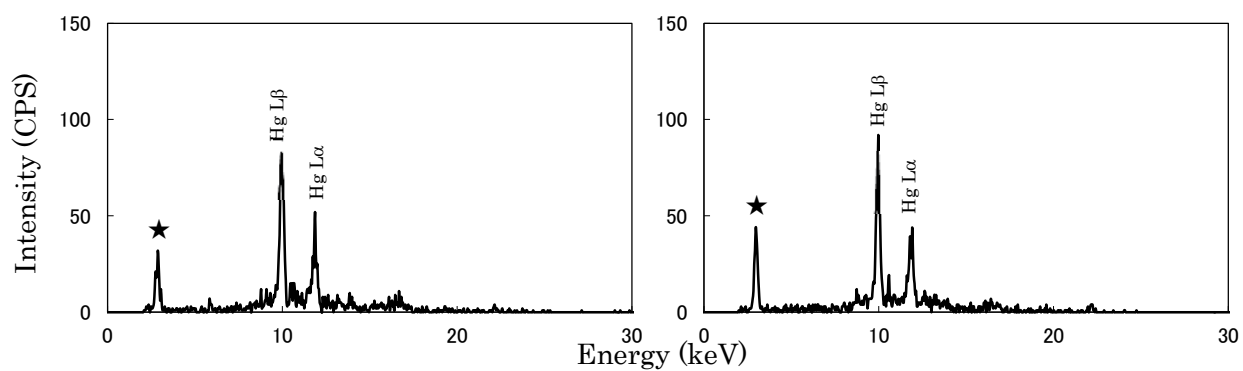
Fig. A.2.4 蛍光 X 線スペクトル (R9 - 12)

X-ray spectra (R9-12)



(a) Front (R13f)

(b) Back (R13b)



(a) Front (R14f)

(b) Back (R14b)

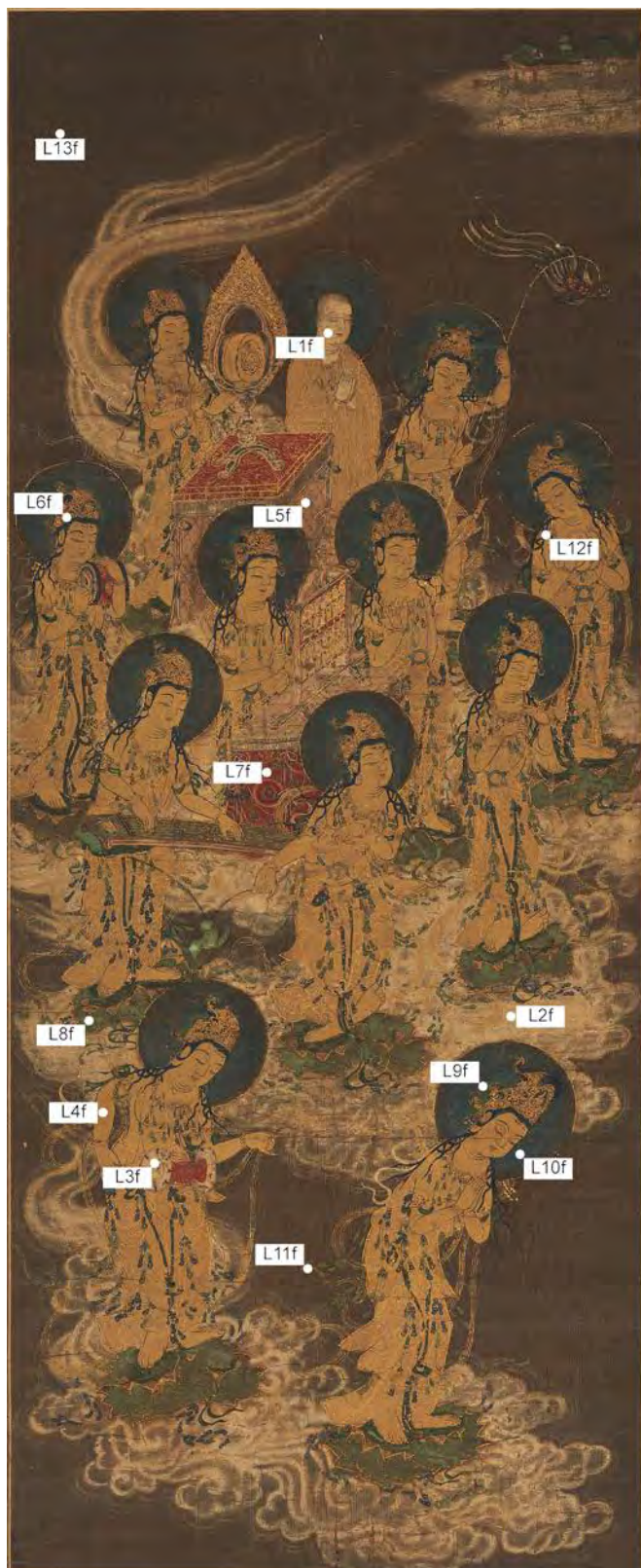
Fig. A.2.5 蛍光 X 線スペクトル (R13~14)
X-ray spectra (R13-14)

Table A.2.1 検出された元素および推測される絵具（右幅）

The detected elements and inferred colorant materials (right scroll)

分析位置	色	検出された元素	推測される絵具
Analysis point	Color	Detected elements	Inferred materials
(R1f)	金、緑 Gold, green	Au, Cu, Pb	金箔もしくは金泥、緑青、鉛丹 Gold leaf or/and pigment, malachite, lead pigment
(R1b)	薄茶 Whitish brown	Au, Pb	金箔もしくは金泥、鉛白 Gold leaf or/and pigment, lead white
(R2f)	薄茶、青 Whitish brown, blue	Pb, Cu, Au	鉛白、群青、金箔もしくは金泥 Lead white, azurite, gold leaf or/and pigment
(R2b)	薄茶 Whitish brown	Pb	鉛白 Lead white
(R3f)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(R3b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(R4f)	金、緑 Gold, green	Pb, Au, Cu	鉛丹、金箔もしくは金泥、緑青 Lead pigment, gold leaf or/and pigment, malachite
(R4b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(R5f)	金 Gold	Au, Pb	金箔もしくは金泥、鉛丹 Gold leaf or/and pigment, lead pigment
(R5b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(R6f)	薄茶 Whitish brown	Pb	鉛白 Lead white
(R6b)	薄茶 Whitish brown	Pb	鉛白 Lead white
(R7f)	緑、青 Green, blue	Cu, Pb, Fe	緑青もしくは群青、鉛丹 Malachite or/and azurite, lead pigment
(R7b)	暗い灰 Dark gray	Cu, Pb	緑青もしくは群青、鉛丹 Malachite or/and azurite, lead pigment
(R8f)	緑、金 Green, gold	Cu, Au	緑青、金箔もしくは金泥 Malachite, gold leaf or/and pigment
(R8b)	灰みの緑 Grayish green	Cu	緑青 Malachite
(R9f)	緑、金 Green, gold	Cu	緑青 Malachite
(R9b)	灰みの緑 Grayish green	Cu	緑青 Malachite
(R10f)	青、白 Blue, white	Cu, Pb	群青、鉛白 Azurite, lead white
(R10b)	灰みの青 Grayish blue	Cu, Pb	群青、鉛白 Azurite, lead white
(R11f)	緑 Green	Cu, Pb	緑青、鉛丹 Malachite, lead pigment

(R11b)	薄茶 Whitish brown	Cu, Pb	緑青、鉛白 Malachite, lead white
(R12f)	無し No color	—	—
(R12b)	無し No color	—	—
(R13f)	緑、青、金 Green, blue, gold	Cu, Pb, Au	緑青もしくは群青、鉛丹、金箔もしくは金泥 Malachite or/and azurite, lead pigment, gold leaf or/and pigment
(R13b)	灰みの緑か青 Grayish green/ blue	Cu, Pb, Au	緑青もしくは群青、鉛丹、金箔もしくは金泥 Malachite or/and azurite, lead pigment, gold leaf or/and pigment
(R14f)	赤 Red	Hg	水銀朱 Vermilion
(R14b)	灰みの赤 Grayish red	Hg	水銀朱 Vermilion



(a)



(b)

Fig. A.2.6 測定位置 左幅 (a) 表面 (b) 裏面
Measuring points, left scroll (a) front side (b) back side

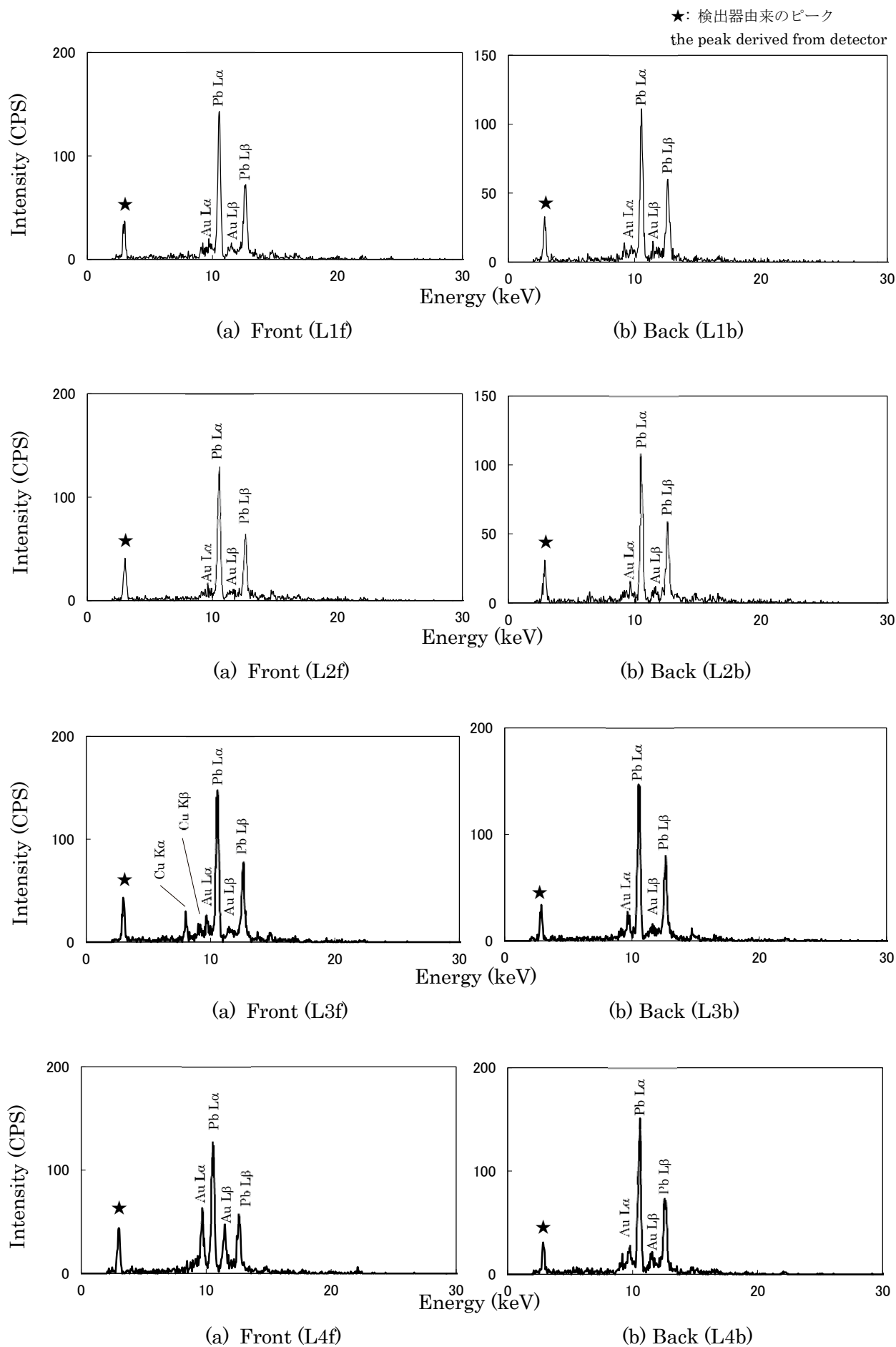


Fig. A.2.7 蛍光 X 線スペクトル (L1~4)
X-ray spectra (L1-4)

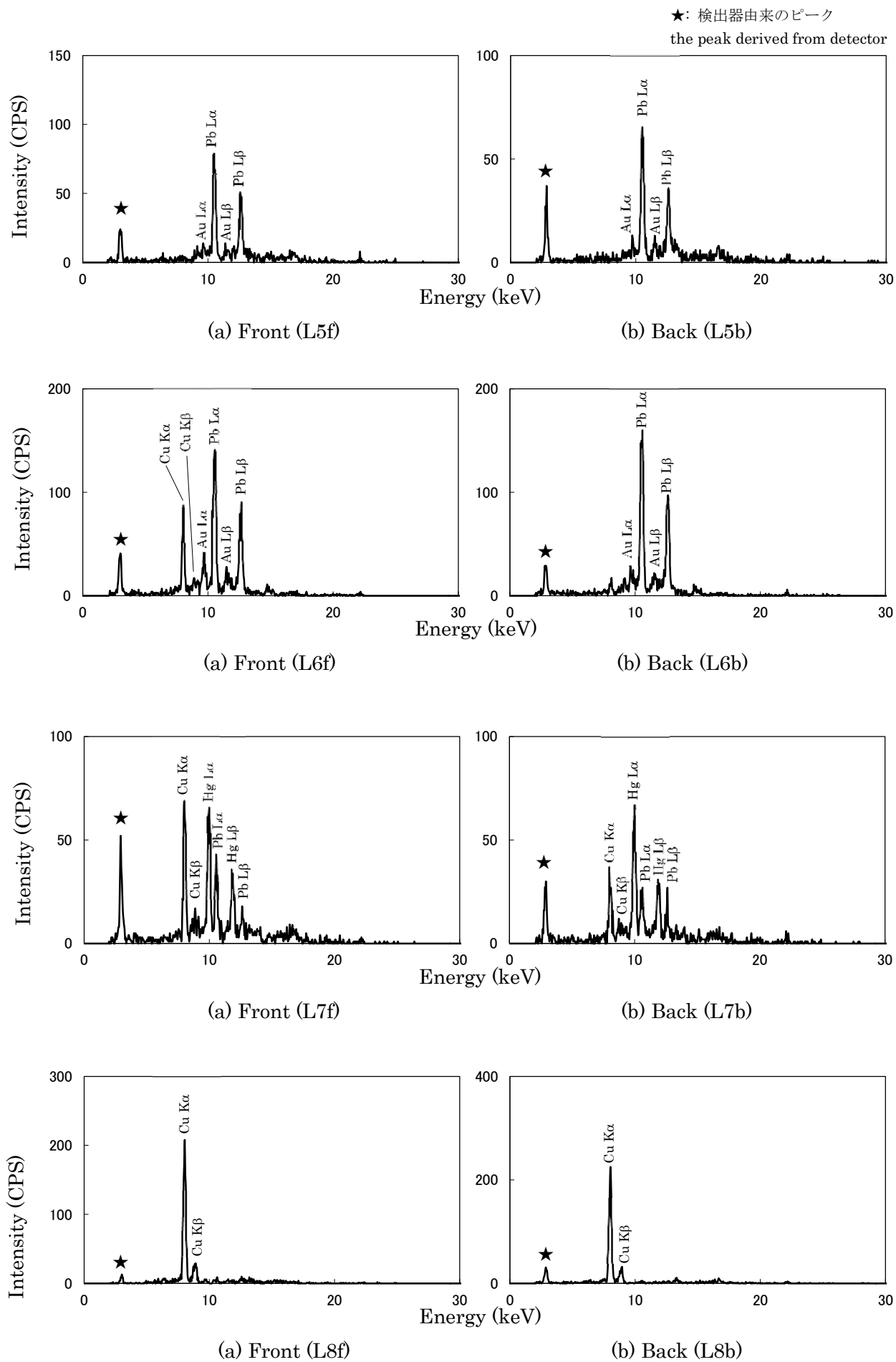
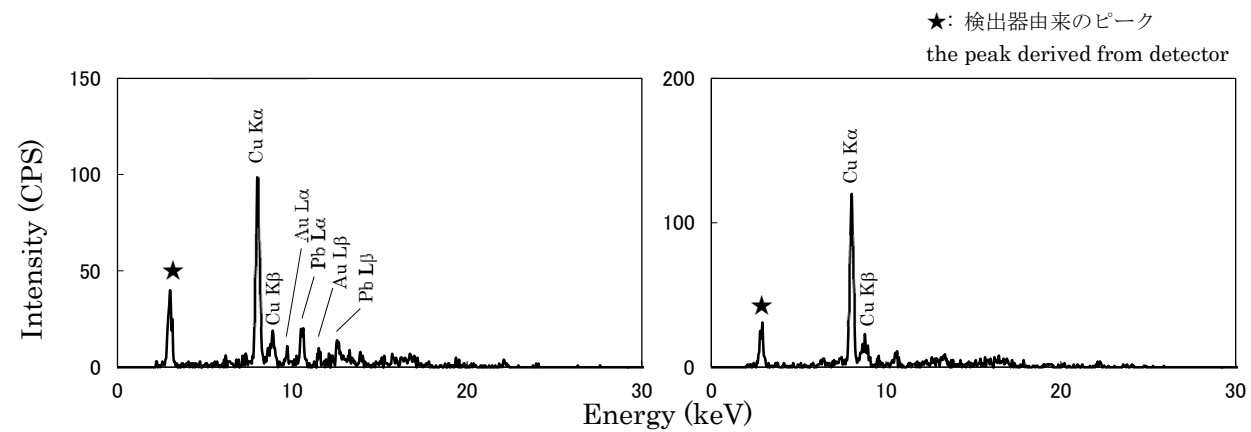
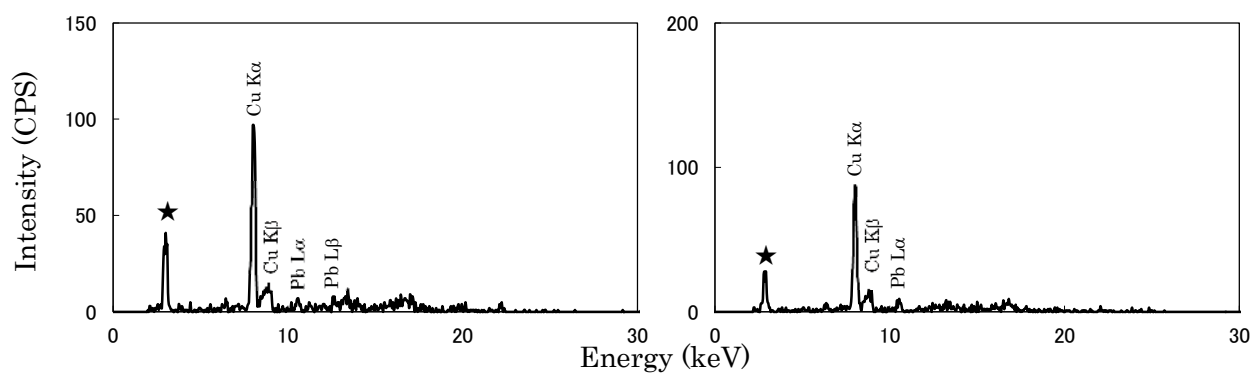


Fig. A.2.8 蛍光 X 線スペクトル (L5~8)
X-ray spectra (L5-8)



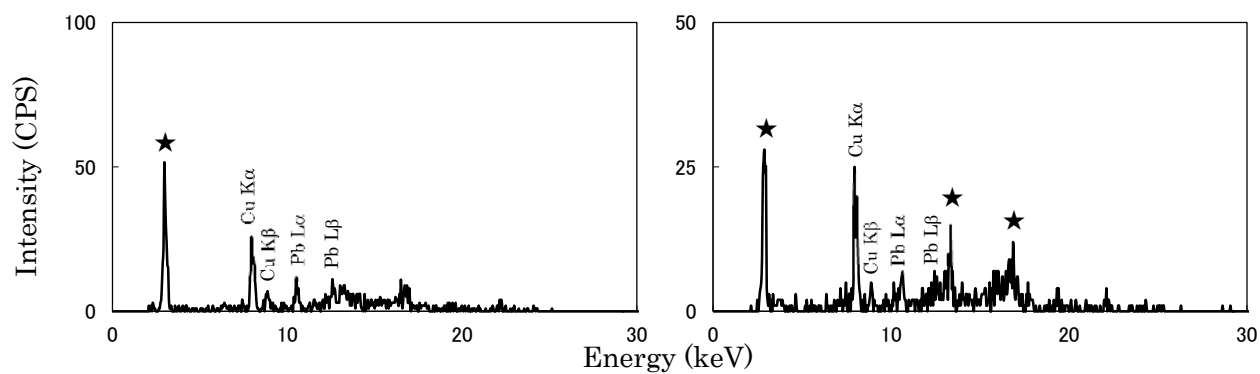
(a) Front (L9f)

(b) Back (L9b)



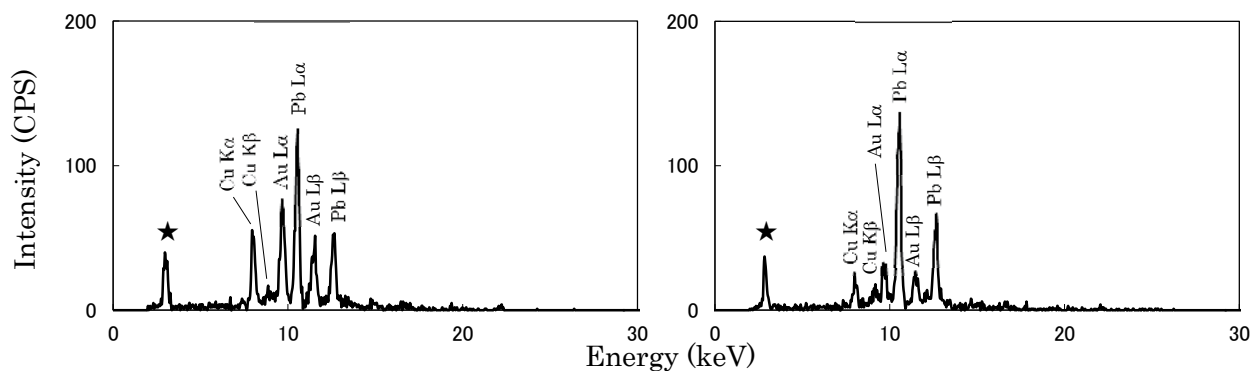
(a) Front (L10f)

(b) Back (L10b)



(a) Front (L11f)

(b) Back (L11b)



(a) Front (L12f)

(b) Back (L12b)

Fig. A.2.9 蛍光 X 線スペクトル (L9~12)
X-ray spectra (L9-12)

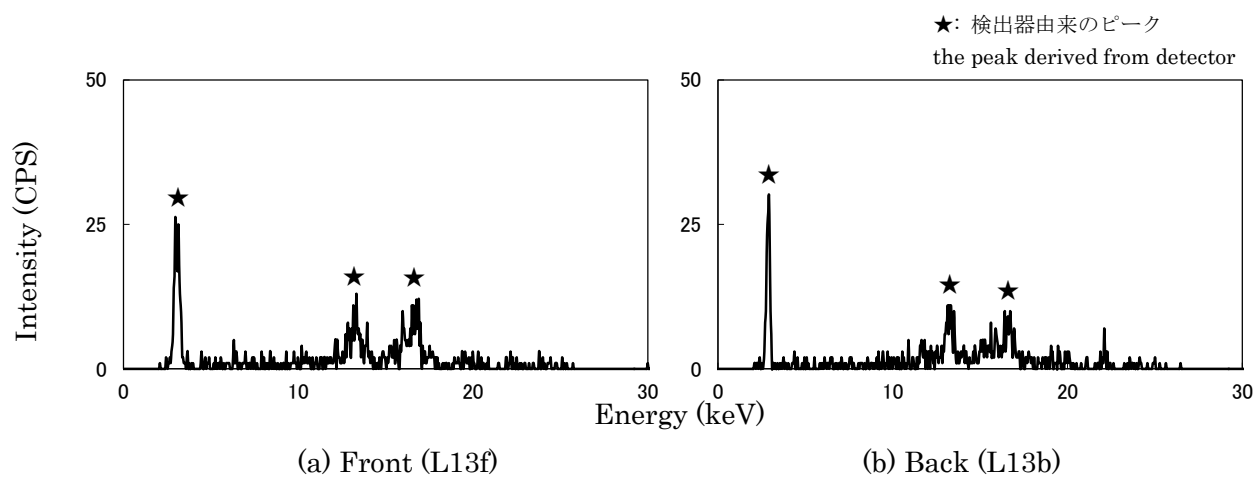


Fig. A.2.10 蛍光 X 線スペクトル (L13)
X-ray spectra (L13)

Table A.2.2 検出された元素および推測される絵具（左幅）

The detected elements and inferred colorant materials (left scroll)

分析位置	色	検出された 元素	推測される絵具
Analysis point	Color	Detected elements	Inferred materials
(L1f)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L1b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L2f)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L2b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L3f)	薄茶、青 Whitish brown, blue	Pb, Cu, Au	鉛白、群青、金箔もしくは金泥 Lead white, azurite, gold leaf or/and pigment
(L3b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L4f)	金 Gold	Au, Pb	金箔もしくは金泥、鉛丹 Gold leaf or/and pigment, lead pigment
(L4b)	薄茶 Whitish brown	Au, Pb	金箔もしくは金泥、鉛丹 Gold leaf or/and pigment, lead white
(L5f)	桃、金 Pink, gold	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L5b)	灰 Gray	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L6f)	桃、金、青 Pink, gold, blue	Pb, Cu, Au	鉛白、群青、金箔もしくは金泥 Lead white, azurite, gold leaf or/and pigment
(L6b)	薄茶 Whitish brown	Pb, Au	鉛白、金箔もしくは金泥 Lead white, gold leaf or/and pigment
(L7f)	赤、緑 Red, green	Cu, Hg, Pb	緑青、水銀朱、鉛丹 Malachite, vermilion, lead pigment
(L7b)	灰みの赤 Grayish red	Cu, Hg, Pb	緑青、水銀朱、鉛丹 Malachite, vermilion, lead pigment
(L8f)	緑 Green	Cu	緑青 Malachite
(L8b)	灰みの緑 Grayish green	Cu	緑青 Malachite
(L9f)	緑、青、金 Green, blue, gold	Cu, Pb, Au	緑青もしくは群青、鉛丹、金箔もしくは金泥 Malachite or/and azurite, lead pigment, gold leaf or/and pigment
(L9b)	暗い灰 Dark gray	Cu	緑青もしくは群青 Malachite or/and azurite
(L10f)	青 Blue	Cu, Pb	群青、鉛丹 Azurite, lead pigment
(L10b)	暗い灰 Dark gray	Cu, Pb	群青、鉛丹 Azurite, lead pigment
(L11f)	緑 Green	Cu, Pb	緑青、鉛丹 Malachite, lead pigment
(L11b)	暗い灰 Dark gray	Cu, Pb	緑青、鉛丹 Malachite, lead pigment
(L12f)	金、青 Gold, blue	Cu, Au, Pb	群青、金箔もしくは金泥、鉛丹 Azurite, gold leaf or/and pigment, lead pigment
(L12b)	薄茶 Whitish brown	Cu, Au, Pb	群青、金箔もしくは金泥、鉛白 Azurite, gold leaf or/and pigment, lead white
(L13f)	無し No color	—	—
(L13b)	無し No color	—	—

付録 3. 測色

Appendix 3. Color measurement

新規肌裏紙による裏打ち後の右幅本紙の裏に、ヤシャと墨を用いて染めた 4 種類の色調の美栖紙を当て、肌裏紙の打ち替えを行っていない左幅本紙と比較した。虚空の色調が暗く沈みすぎないこと、反対に明るくなりすぎないこと、雲のぼかし表現が不鮮明にならないこと、また各絵具の色調に留意し、目視による観察を行った。特に、表裏のどちらからも絵具が施されていない虚空は、料絹の隙間から裏打ち紙が直接見える地透けの状態であるため、裏打ち紙の色調が虚空の色調に与える影響が大きいため慎重な判断が必要であった。検討の結果、ヤシャで染めた美栖紙を使用することとした。併せて検討時の虚空 (Fig. A.3 の A~E) の色調を分光で測色し、今回の検討の記録資料とした。

Misu paper having 4 different color tones were prepared by dyeing with *yasha* and ink. These were placed against the verso of the right scroll that had been lined with the new first lining paper and compared with the first lining of the left screen that had not yet been lined. The samples were visually observed to determine whether the color tone was neither too dark nor too light and that the gradation on the clouds did not become too unclear, paying attention to the balance with the color tones of all paints used. Since the background, both sides of which had not been painted, was in such a condition that lining papers could be seen through the weave count, it was necessary to consider the effect that the color tone of the lining paper would have on the color tone of the background. As a result of discussion among restorers, it was decided that *misu* paper dyed with *yasha* was used. Moreover, the color tone of the background (A-E in Fig. A.3) at the time of discussion was measured with a portable spectrophotometer. Data thus obtained was added to the records relating to restoration.

測定者 ; 山田祐子、楠京子

測定装置 ; 分光測色計 (CM-2600d、コニカミノルタ)

測定条件 ; 光源 D65

観察視野角 10°

測定径 8mm

測定箇所 ; Fig. A.3 参照

Measurer; Yuko Yamada, Kyoko Kusunoki

Apparatus; Portable spectrophotometer (CM-2600d, Konica-Minolta)

Measurement conditions; D65 (illuminant)

10° (observation visual field)

8 mm (measurement area)

Measurement points; refer to Fig. A.3



(a)



(b)

Fig. A.3 測色箇所 (a) 左幅 修復前 (b) 右幅 新規肌裏打ち後

Measuring points (a) left scroll, before restoration (b) right scroll, after new first lining

Table A.3

本紙 L*a*b*
L*a*b* of the artwork

	Measuring points	Dyed <i>misu</i> paper	正反射光を含む値 (SCI)			正反射光を含まない値 (SCE)		
			Specular component included (SCI)			Specular component excluded (SCE)		
			L*	a*	b*	L*	a*	b*
修復前 Before restoration	A	Original	33.61	2.52	9.41	33.46	2.54	9.43
	B	Original	34.50	3.58	12.13	34.39	3.59	12.16
	C	Original	35.09	2.41	10.88	34.97	2.43	10.89
		—	34.78	4.21	12.51	34.63	4.23	12.52
		ヤシャ <i>Yasha</i>	34.13	3.58	11.34	34.00	3.60	11.35
		淡墨 Ink (thin)	34.45	3.54	11.65	34.31	3.55	11.68
	D	濃墨 Ink (thick)	33.72	3.26	10.84	33.57	3.27	10.88
		ヤシャ・墨 <i>Yasha</i> and ink	33.68	3.22	10.91	33.56	3.23	10.93
		—	36.21	4.08	13.54	36.04	4.09	13.57
		ヤシャ <i>Yasha</i>	35.22	3.57	12.20	35.06	3.59	12.22
		淡墨 Ink (thin)	35.80	3.51	12.69	35.63	3.53	12.71
	E	濃墨 Ink (thick)	35.07	3.18	12.10	34.91	3.20	12.16
		ヤシャ・墨 <i>Yasha</i> and ink	34.83	3.31	11.95	34.68	3.34	11.97

新規肌裏打ち後
After new
first lining

※ヤシャは木灰抽出液（pH10.5）で媒染した。

Yasha samples were made mordant in solution of oak ash (pH 10.5).

付録 4. 調湿

Appendix 4. Conditioning

使用機器； 恒温恒湿槽 TBL-3HW2G2AC（タバイエスペック）

調湿期間； 2 か月間

Apparatus; an environmental control chamber, TBL-3HW2G2AC, TABAI ESPEC

Duration; two months

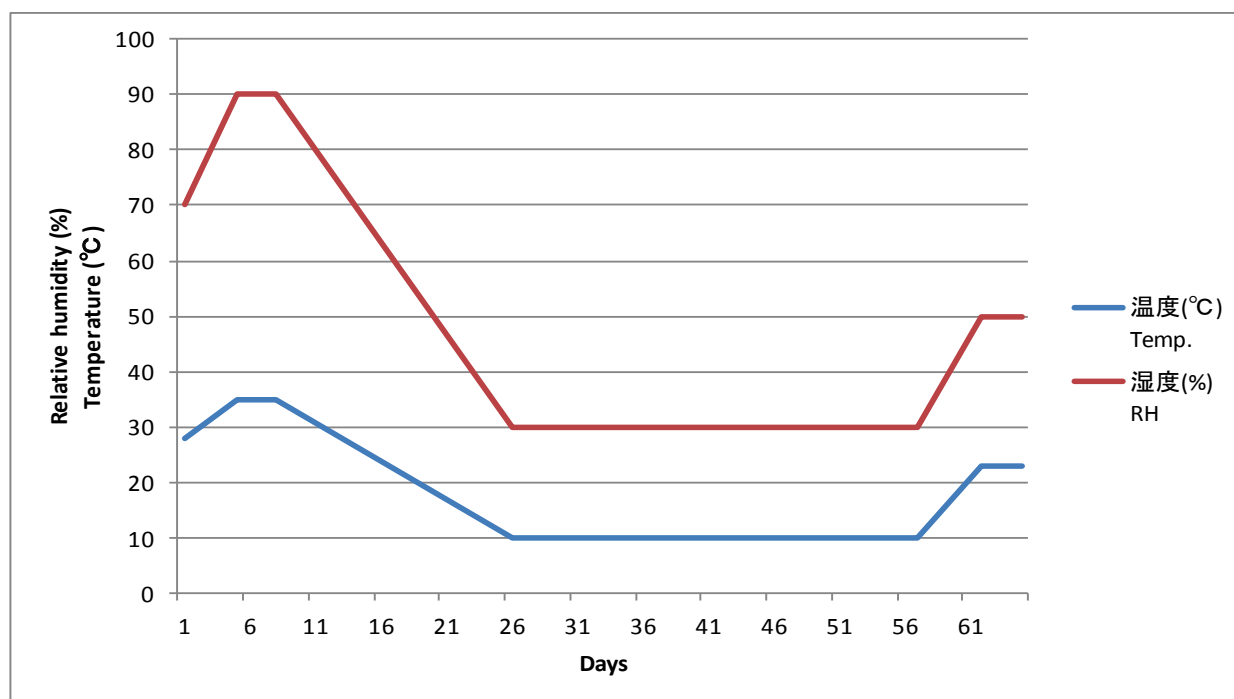


Fig. A.4 調湿期間中の温度湿度設定
Temperature and humidity during conditioning

東京文化財研究所

平成 26 年度

在外日本古美術品保存修復協力事業

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