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THE 'SLASH OF LIGHT' IN THE LATE RELIGIOUS PAINTINGS OF MATTIA PRETI TECHNIQUE AND MATERIALS

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Abstract

In this paper are reported the main results of the analysis performed on three paintings by Mattia Preti. In particular, the investigated paintings are: The penitent Saint Peter (around 1680), Saint Peter blessing (around 1690) and The Madonna of Sorrows (around 1690), all of them coming from Wignacourt College Museum of Rabat in Malta. They were examined on the occasion of the restoration required for the exhibition (2004-2005) of the paintings in Viterbo (Italy). The short time available for the restoration and for the exhibition preparation made possible to perform only some selected investigations focused to detect some aspects of the technique and materials used by Mattia Preti for creating his special 'slash of light'.
After a preliminary examination by means of infrared reflectrography and X-ray radiography, performed by a private diagnostics society (Emmebici scientifica), four samples from each painting were taken off and were analysed by means of polarizing light microscopy, Fourier transform infrared spectroscopy and Raman microscopy.

Keywords: Mattia Preti, painting analysis, FTIR, Raman microscopy, cross-sections

1. Introduction

In association with the exhibition 'A slash of light' carried out in Viterbo (Italy) from 17th December 2004 to 30th January 2005, it was possible to analyse three of the paintings by Mattia Preti (1613-1699) that had undergone a restoration intervention [1]. In particular, the investigated paintings have been: The penitent Saint Peter (around 1680, oil on canvas, Figure 1), Saint Peter blessing (around 1690, oil on canvas, Figure 2) and Madonna of Sorrows (around 1690, oil on wood panel, Figure 3), all of them belonging to Wignacourt College Museum of Rabat in Malta. The exhibition in Viterbo, the first one ever dedicated to the poetics of light in the paintings of Mattia Preti, gave the opportunity to compare the 'slash of light' in *Caravaggesque* style that Mattia

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Preti adopted in his youthfulness with the use of light in his most mature works of art to which the three investigated paintings belong [1].

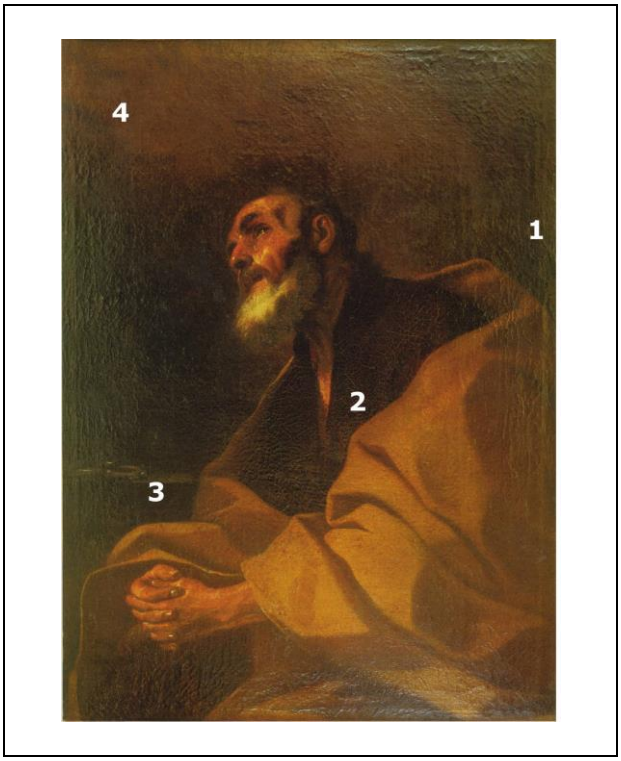

Figure 1. The penitent Saint Peter, oil on canvas, cm 129 x 93, with the sampling points.

The style of Preti, whose indivisible aspects of the life were faith, art and knighthood, in the last period of his production is characterised by a deep and "pensive treatment of light", as Spike writes in the Introduction of the Exhibition Catalogue [1, p. 11], and which is visible in the three paintings analysed in this paper.

In order to support the restoration works, performed by Giorgio Capriotti, on the occasion of the exhibition, some analysis was addressed to clarify the composition and especially the stratigraphy of the paintings [2].

Before sampling, a preliminary examination by means of infrared reflectrography and X-ray radiography was performed by Emmebici scientifica (Rome) [2]. A synthesis of this preliminary diagnostic campaign was reported in the exhibition catalogue [2]. Infrared reflectography and X-ray radiography supplied information on the execution techniques in a totally non-invasive modality. In particular, the comparison between the faces of Saint Peter in the two paintings by X-ray showed that the execution modalities are completely different: very elaborate for *The penitent Saint Peter* and extemporary for *Saint Peter blessing*. The IR reflectography highlighted the original background made of vermilion, red lead and a red lake [2].

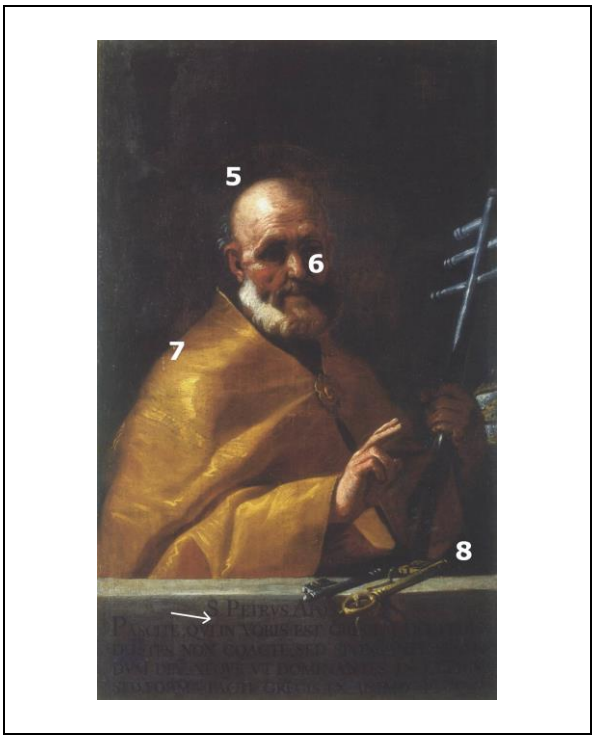

Figure 2. Saint Peter blessing, oil on canvas, cm 122 x 73, with the sampling points and some areas of the brown setting remained at sight (arrow).

Figure 3. Madonna of Sorrows, oil on wood panel, cm 33 x 25, with the sampling points.

On the base of this preliminary examination, four samples from each painting were taken off and they were analysed by means of polarizing microscope, FTIR and micro-FTIR spectrometry, Raman microscopy. These techniques were used to detect pigments and binders in the examined samples, by following a methodological approach widely used in our previous works [3-7].

2. Experimental

Observation and photography of the samples cross-sections and pigment powders embedded in Canada balsam were performed by a Zeiss Axioskop polarising microscope equipped with a Zeiss AxioCam digital camera. The cross-sections were also studied under UV lighting using a Mercury Vapour lamp directly connected to the microscope in order to observe fluorescence of the materials.

Infrared spectra were obtained using a Nicolet Avatar 360 Fourier transform spectrometer. For each sample 128 scans were recorded in the 4000 to 400 cm^{-1} spectral range in diffuse reflection modality (DRIFT) with a resolution of 4 cm^{-1}. Spectral data were collected with OMNIC 8.0 (Thermo Electron Corporation) software. Samples were ground with spectrophotometric grade KBr (1% sample in KBr) in an agate mortar. The KBr powder spectrum was used as background.

The micro-Raman spectrometer was a Labram Model of the Horiba Jobin Yvon with a spatial resolution of 1 μm and the possibility of fast detecting owing to the use of a CCD detector with 1026x256 pixels cooled to -70°C by the Peltier effect. The spectral resolution was 1 cm^{-1}. The exiting wavelength was the 632.8 nm red line of a He-Ne laser. Integration times varied between 10 and 20 s with 5 accumulations. The output power for the He-Ne laser was 5 mW.

3. Results and discussion

The UV fluorescence analysis of the samples taken from *The penitent Saint Peter* revealed the priming is made up of fossil rich calcium carbonate, red ochre and linseed oil (Figure 4A). The presence of fossils testified the use of an organogenic sedimentary limestone, probably the globigerina, which is the main rock in Malta [8]. These materials were confirmed by FT-IR analysis performed on samples 1-4 that gave similar results in term of main IR absorptions. In Figure 5 the FT-IR spectrum of sample 3 is shown, as example.

Calcium carbonate absorptions are visible at cm^{-1}: 2513, 1794, 1454, 874, 848, and 713. Siccative oil main absorptions are located at cm^{-1}: 3351, 2922, 2853, 1705, 1180, and 1089. Metal-carboxylate absorptions are also visible at 1620 and 1535 cm^{-1}: they are due to oil-pigments interactions in paintings, as discussed in the literature [9]. Absorptions attributable to red ochre are also visible at cm^{-1}: 1037, 781, 518 and 470 (these last two are due to hematite). The

weak absorption at 1574 cm^{-1} may be associated to aromatic compounds and the absorption at 1319 cm^{-1} is typical for oxalates.

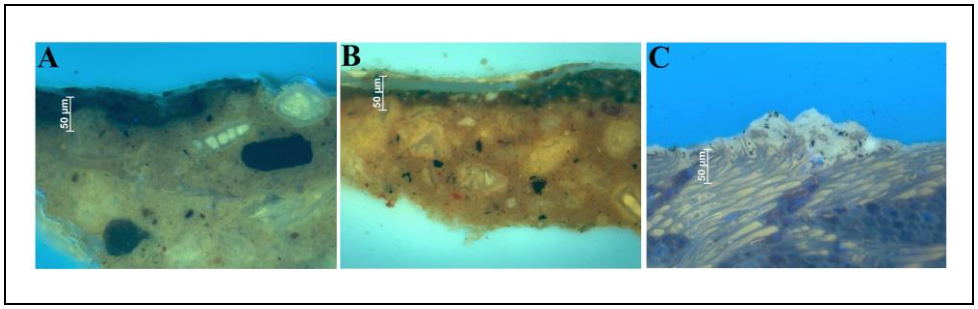

Figure 4. Cross-section of micro-samples from the investigated paintings, under UV fluorescence: A) sample 3 from *The penitent Saint Peter*, B) sample 7 from *Saint Peter blessing*, C) sample 10 from *Madonna of Sorrows*.

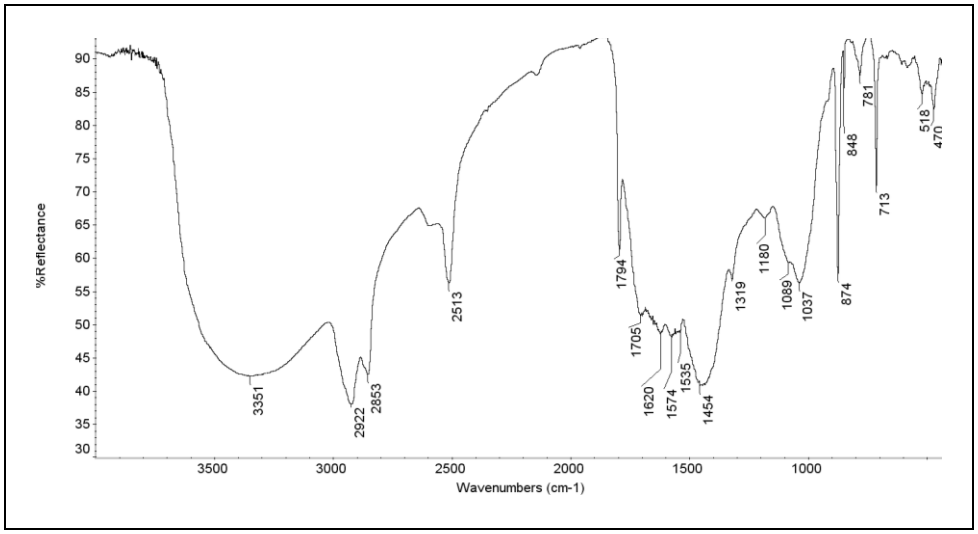

Figure 5. FT-IR spectrum of sample 3 from *The penitent Saint Peter*.

Micro-Raman analysis confirmed the presence of calcite and carbon black in all examined samples. Calcite is characterised by a sharp strong absorption at 1088 cm^{-1}; carbon black by two broad strong absorptions around 1350 and 1587 cm^{-1} (Figures 6 and 7). The pictorial layers are complex and articulate with the presence of vermilion, red lead, blue smalt, indigo and red lake. Vermilion (Figure 8), red lead (Figure 9) and indigo (Figure 10) were characterised by micro-Raman analysis; smalt and red lake were detected through polarising microscope. The black areas are made of vine black and copper resinate as siccative agent for the black pigment, as observed under polarising microscope. Vine black has the typical elongated flakes that resemble to little piece of carbonised wood [10].

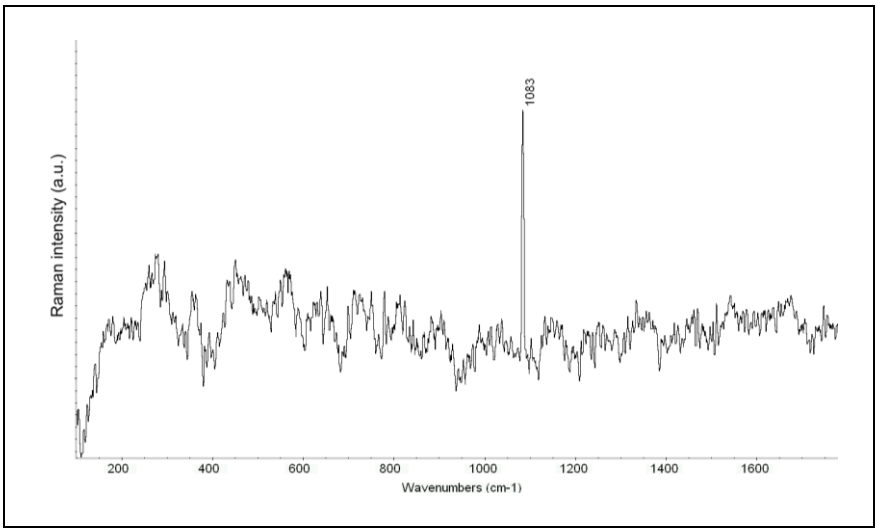

Figure 6. Raman spectrum of white area in sample 7 from *Saint Peter blessing*. Calcite was detected in all the examined samples.

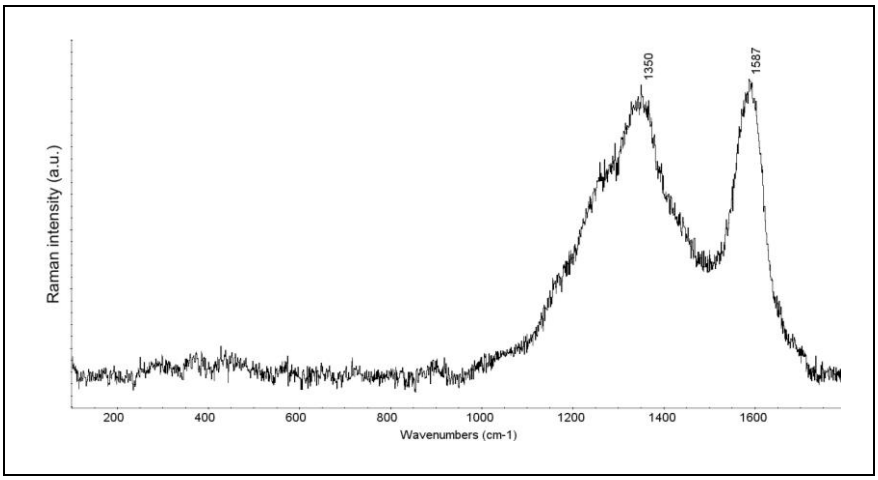

Figure 7. Raman spectrum of black area in sample 9 from *Madonna of Sorrows*. Carbon black was detected in all the examined samples.

The analysis of the painting *Saint Peter blessing* showed a very different technical procedure: this oil on canvas was realized in an extemporaneous manner, the light and shade effects have a greater contrast. The brown priming is made of siccative earths, calcium carbonate and linseed oil (Figure 4B) and in some areas it remained at sight, in particular in correspondence of the letters in the epigraph citing the Letter I of Saint Peter (Figure 2, indicated by an arrow). Hematite was detected by Raman analysis in all samples from this painting (Figure 11). In *Saint Peter blessing*, Mattia Preti used vine black and probably bitumen for the darker areas as the eye cavities.

FT-IR spectra of samples from *Saint Peter blessing*, confirmed the presence of calcium carbonate, siccative oil, ochre and aromatic compounds that can be associated to bitumen (Figure 12).

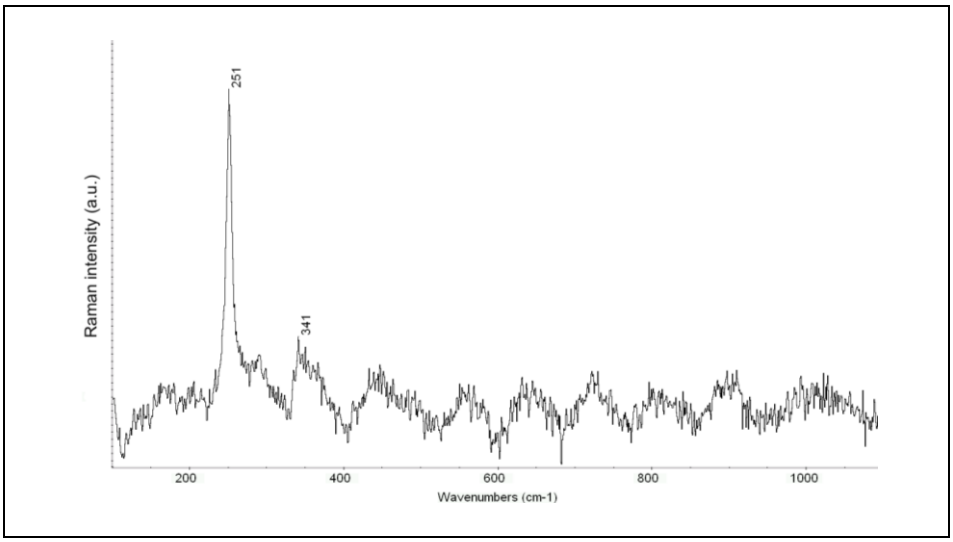

Figure 8. Raman spectrum of red area in sample 1 from *The penitent Saint Peter*. Vermilion was found also in samples 2, 4, 6, and 7.

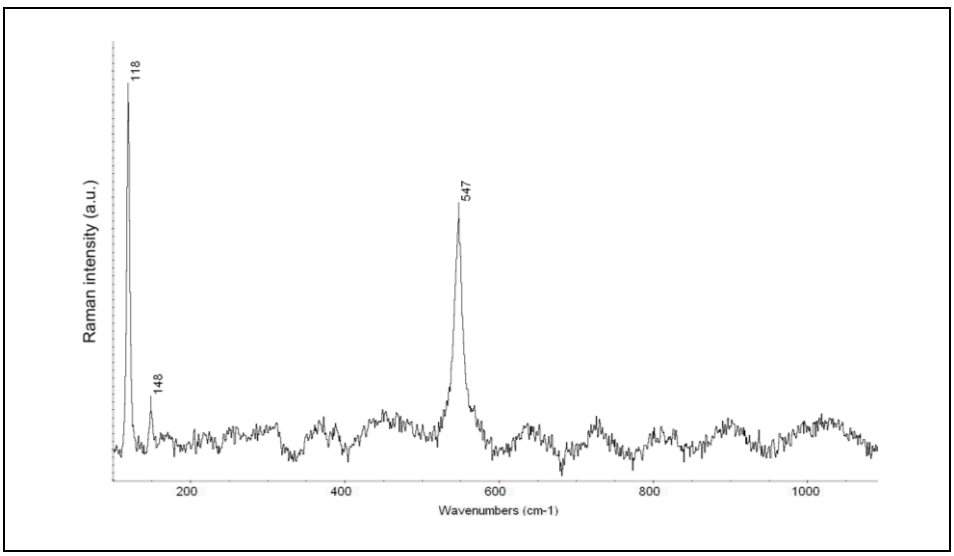

Figure 9. Raman spectrum of red-orange area in sample 2 from *The penitent Saint Peter*. Red lead was found also in samples 8 and 9.

The study of *Madonna of Sorrows*, a diminutive masterpiece of Mattia Preti realized on a wood panel, showed that the priming was made up of a bluish layer. The mineralogical and chemical analyses revealed that this layer is composed of white and black pigments, in particular calcium carbonate white

and vine black (Figure 4C). This last pigment gives rise to an optical phenomenon that produces a bluish hue. This peculiarity of the vine black was often employed by the artists, like Rubens and Van Dyck, in order to obtain a bluish hue of the priming or of the pictorial layer [11].

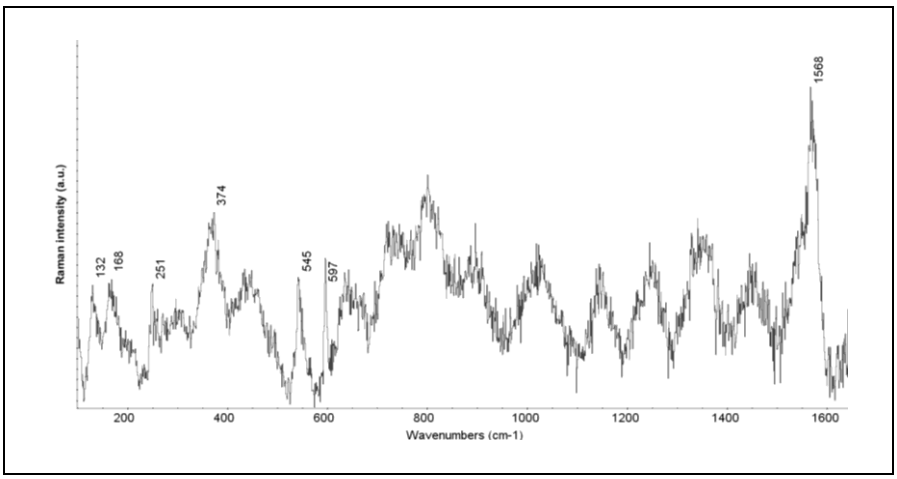

Figure 10. Raman spectrum of dark blue area in sample 2 from *The penitent Saint Peter*.

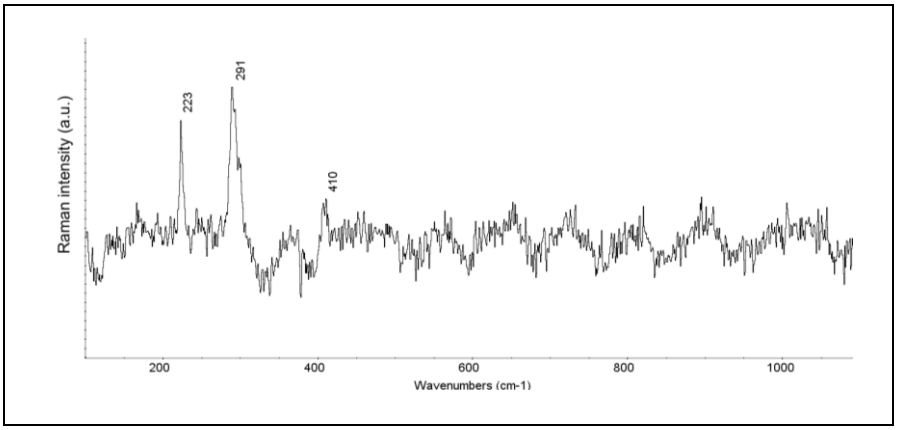

Figure 11. Raman spectrum of red area in sample 6 from *Saint Peter blessing*. Hematite was found also in samples 2, 7, and 8.

The white highlighting of the Madonna's face was obtained with lead white (see FTIR spectrum in Figure 13) and yellow-orange pigments; the shades were made of vine black and bitumen (observed under polarising microscope).

Raman analysis on sample 9 from *Madonna of Sorrows* revealed the presence of carbon black, red lead and lead white (characterised by the weak sharp band at 1050 cm^{-1}).

The FT-IR spectrum of Figure 13 shows bands attributable to the binder, a siccative aged oil with the absorptions located at cm^{-1}: 3334, 2924, 2854, 1736, 1709, and 1100. The absorption at 1522 cm^{-1} is due to lead carboxylates that form between lead white and carboxylic acid part of siccative oil [9].

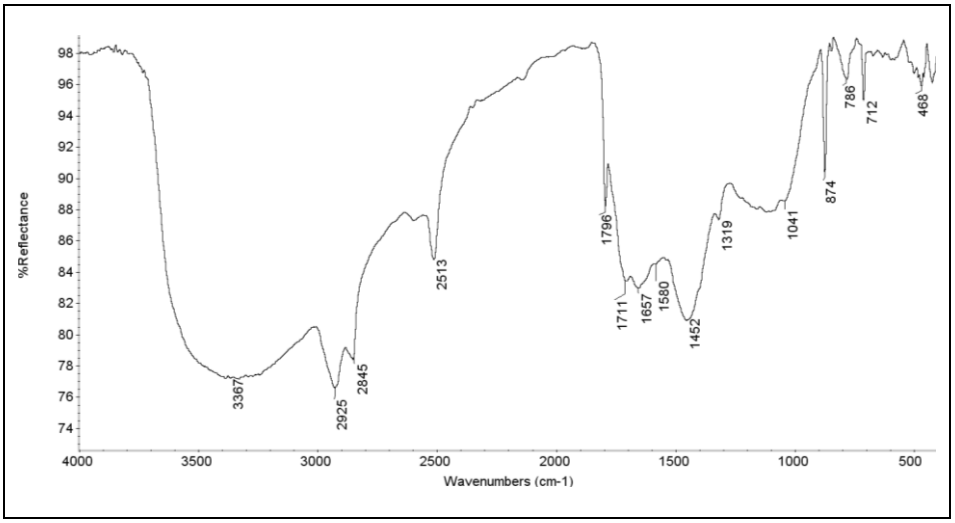

Figure 12. FT-IR spectrum of sample 5 from *Saint Peter blessing*.

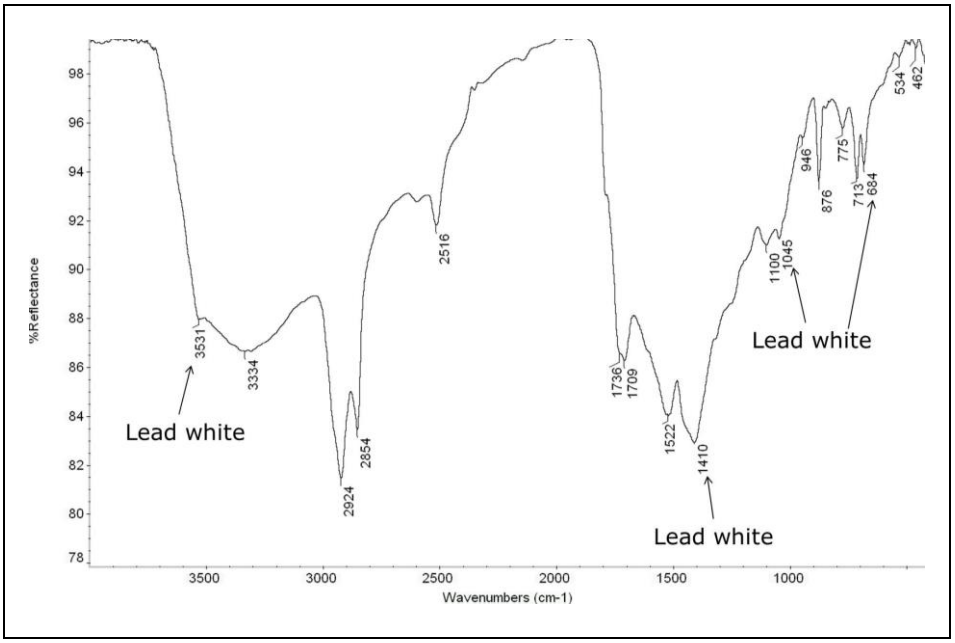

Figure 13. FT-IR spectrum of sample 10 from *Madonna of Sorrows*. The characteristic absorptions of lead white are indicated by arrows.

4. Conclusions

The scientific investigation on three paintings of Mattia Preti gave the opportunity of examining the materials and techniques of this Master of the 17th century, with a focus on his late production activity that has been carried out in Malta.

The three painting, even if characterised by a similar light treatment, were created with different approaches: more careful in *The penitent Saint Peter*, extemporaneous in *Saint Peter blessing*, and simple in *Madonna of Sorrows* (almost black and white), but with a great knowledge of materials. In fact, in the little panel, Preti used the peculiarity of the vine black in order to obtain a bluish hue of the pictorial layer.

In conclusion, the exhibition in Viterbo and the analysis performed on the three chosen masterpieces, gave the opportunity to discover "that slashing ray of light that is as revealing of the spirit, as of the visual world", to quote the words of John T. Spike in the introductory paragraph of the exhibition catalogue [1].

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