

# San Gregorio polyptych by Antonello da Messina: a diagnostic campaign on the state of the artwork conservation

Fausta Giacobello <sup>(a)</sup>, Viviana Mollica Nardo <sup>(a)</sup>, Caterina di Giacomo <sup>(b)</sup>, Gianfranco Anastasio <sup>(b)</sup>, Maria Luisa Saladino <sup>(c)</sup>, Giuseppe Lupò <sup>(a)</sup>, Maria Francesca Alberghina <sup>(d)</sup>, Salvatore Schiavone <sup>(d)</sup>, Franz Saija <sup>(a)</sup>, Rosina Celeste Ponterio <sup>(a)</sup>

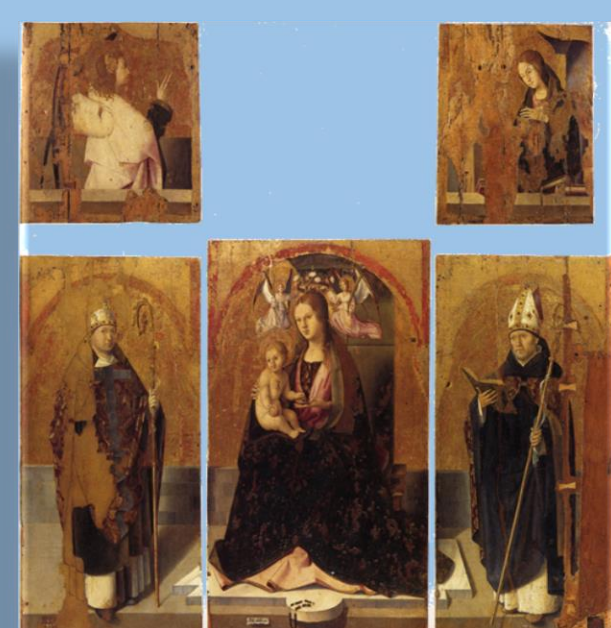
<sup>(a)</sup> IPCF – Istituto per i processi Chimico – Fisici CNR di Messina, V.le Ferdinando Stagno d'Alcontres, 37, 98158 Messina, Italy

<sup>(b)</sup> Museo Regionale Interdisciplinare di Messina, Viale della Libertà, 465, 98121 Messina, Italy

<sup>(c)</sup> Dipartimento Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche - STEBICEF and INSTM UdR - Palermo, Università di Palermo, Viale delle Scienze pad.17, 90128, Palermo, Italy

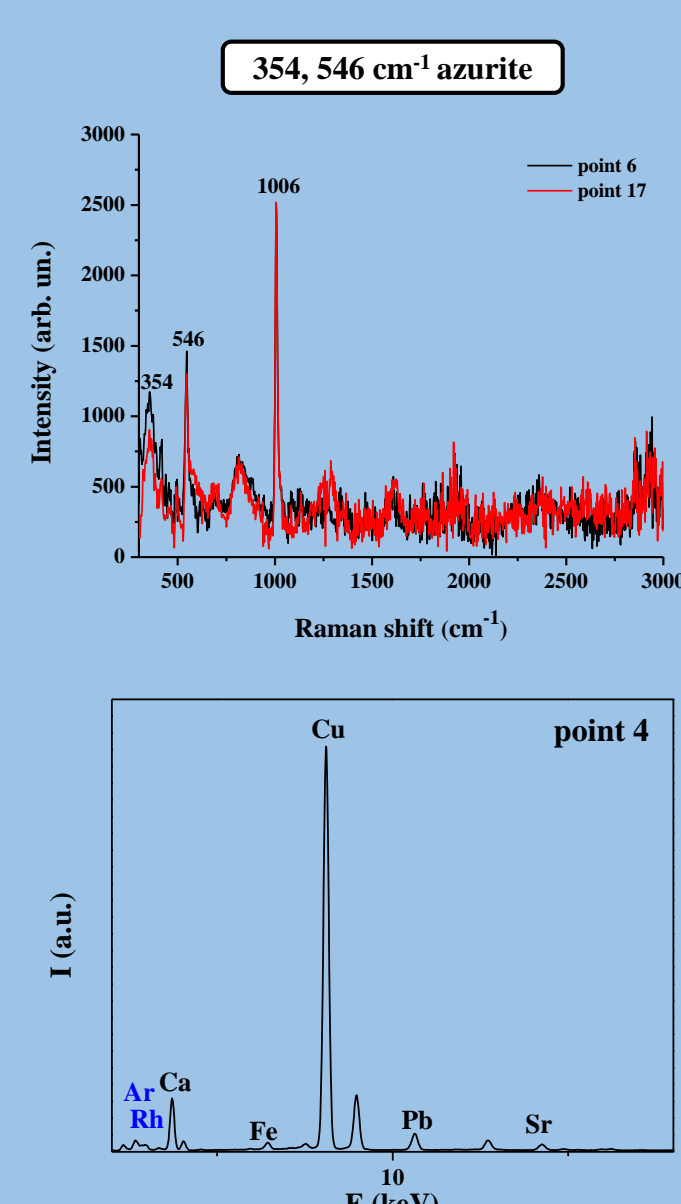
<sup>(d)</sup> Conservation Scientist, S.T.art-test

*fausta.giacobello@ipcf.cnr.it*



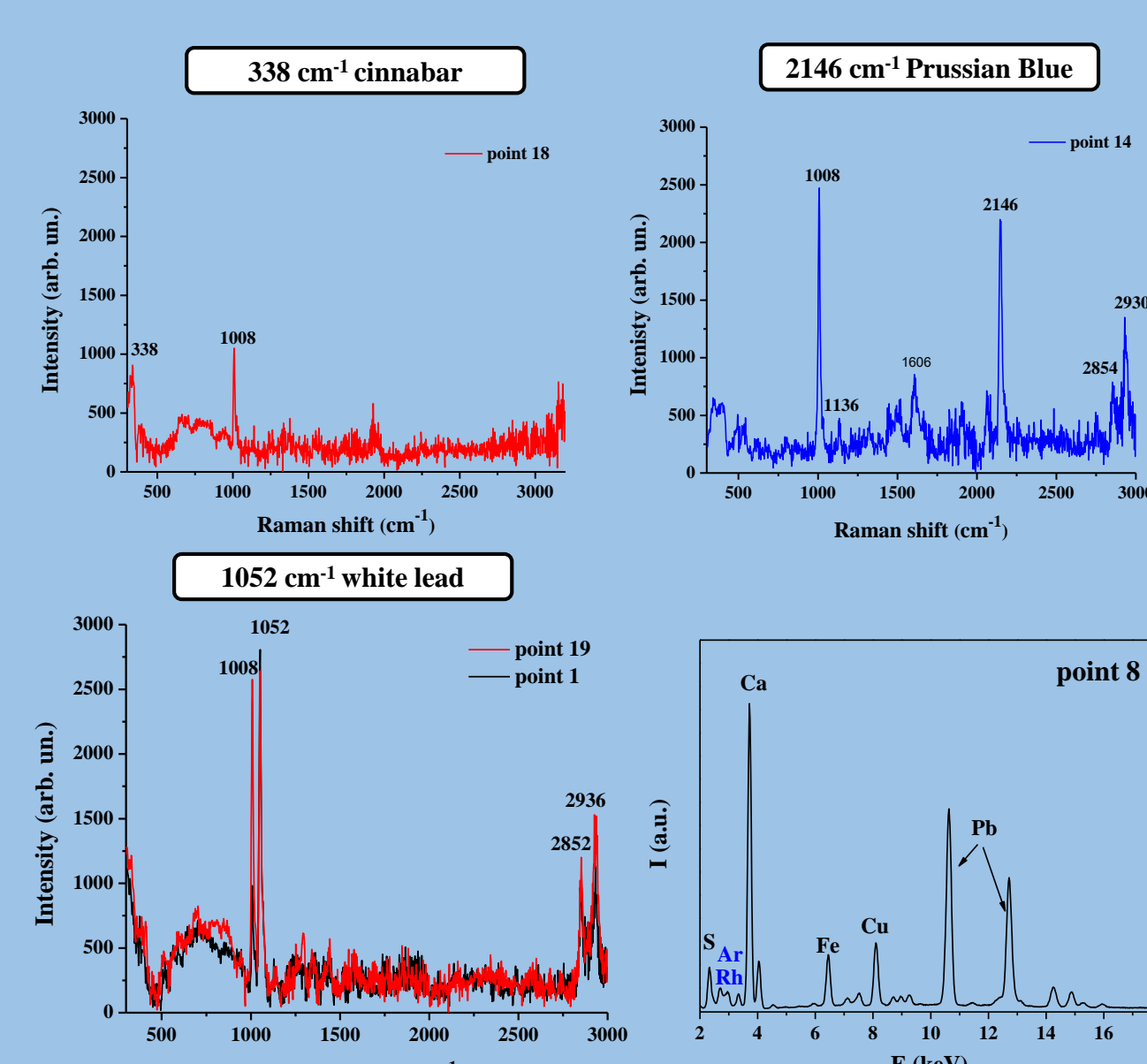
The present communication aims to show the result obtained during a diagnostic campaign of measurements conducted on the San Gregory polyptych, painted by the Italian Renaissance master Antonello da Messina and housed in the Regional Museum of Messina. More in detail, a Raman and X-Ray fluorescence (XRF) spectroscopy study were carried out with the aim to identify the molecular species, organic and inorganic respectively, present in the pictorial layer both in the pigment and the binder form. Raman and XRF spectroscopic analysis were performed by means of a Bruker BRAVO Handheld Raman Spectrometer by Duo LASER, which works with two excitation lasers with wavelengths located in the range 700 - 1100 nm, in order to mitigate the fluorescence phenomena, and a Tracer III SD Bruker AXS having a Rhodium tube as X-ray source, respectively. Moreover, thermal analysis, IR reflectography and UV fluorescence investigations were carried out to study possible detachments in flat wood panels and map the subsurface layer of the artwork.

## Raman and XRF Spectroscopy



### San Gregorio

The peak of Iron (Fe) and Manganese (Mn), together with the signals of Gold (Au) and traces of Copper (Cu) (points 3, 20 and 21), suggest the presence of a soil, called amber soil, natural or burnt, used for the bolus. The presence of Copper in the garment (point 4), in the violet (point 11) and blues paintings (point 8) is ascribable to a cupric pigment, such as verdigris or malachite for the green shades and azurite for the blue tones.



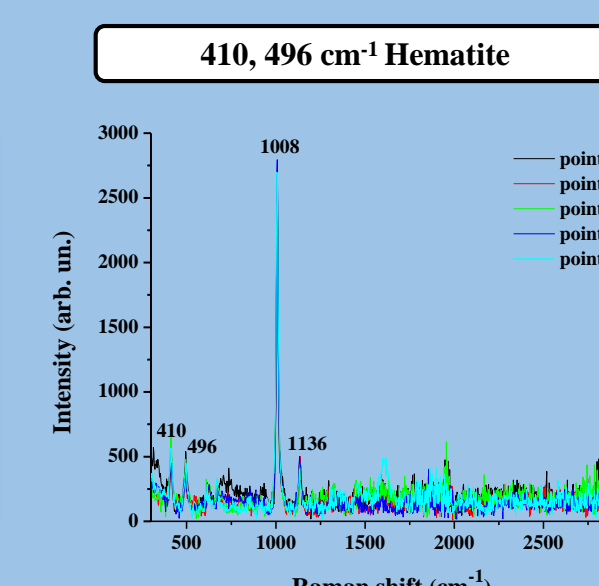
### San Benedetto

Iron oxide was found for red patterns (points 9, 11, 13, 20, 21). Cinnabar was used to depict the mouth and cheek (points 17 and 18). In these last points the presence of Tin is also observed (Sn), indicative of the tin yellow use, pigment that could have been used to better achieve the desired tonality. The presence of Cadmium (Cd) (points 7 and 8), Gold (Au) (point 8 and 10) and Barium (Ba) (points 1 and 2) is also pointed out. The presence of Zinc (Zn) signals is apparent from the XRF spectra

The red backgrounds are of dual nature: cinnabar for incarnates and the red band at the top of the table (point 22) and hematite for the points on the dress (points 5, 7, 10).

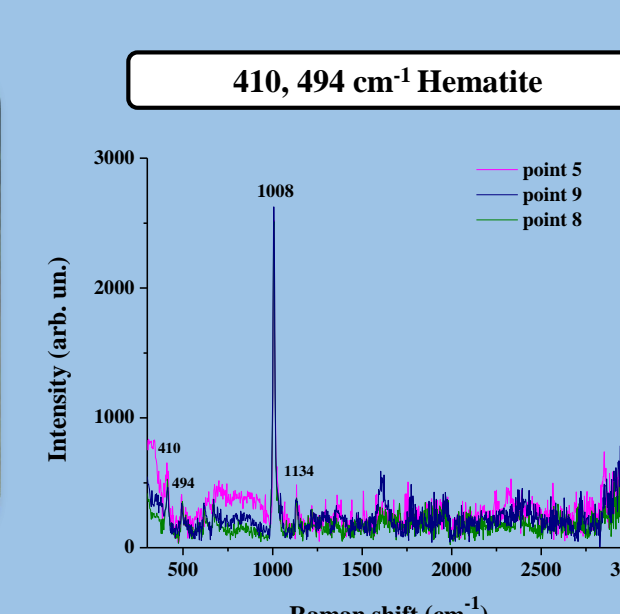
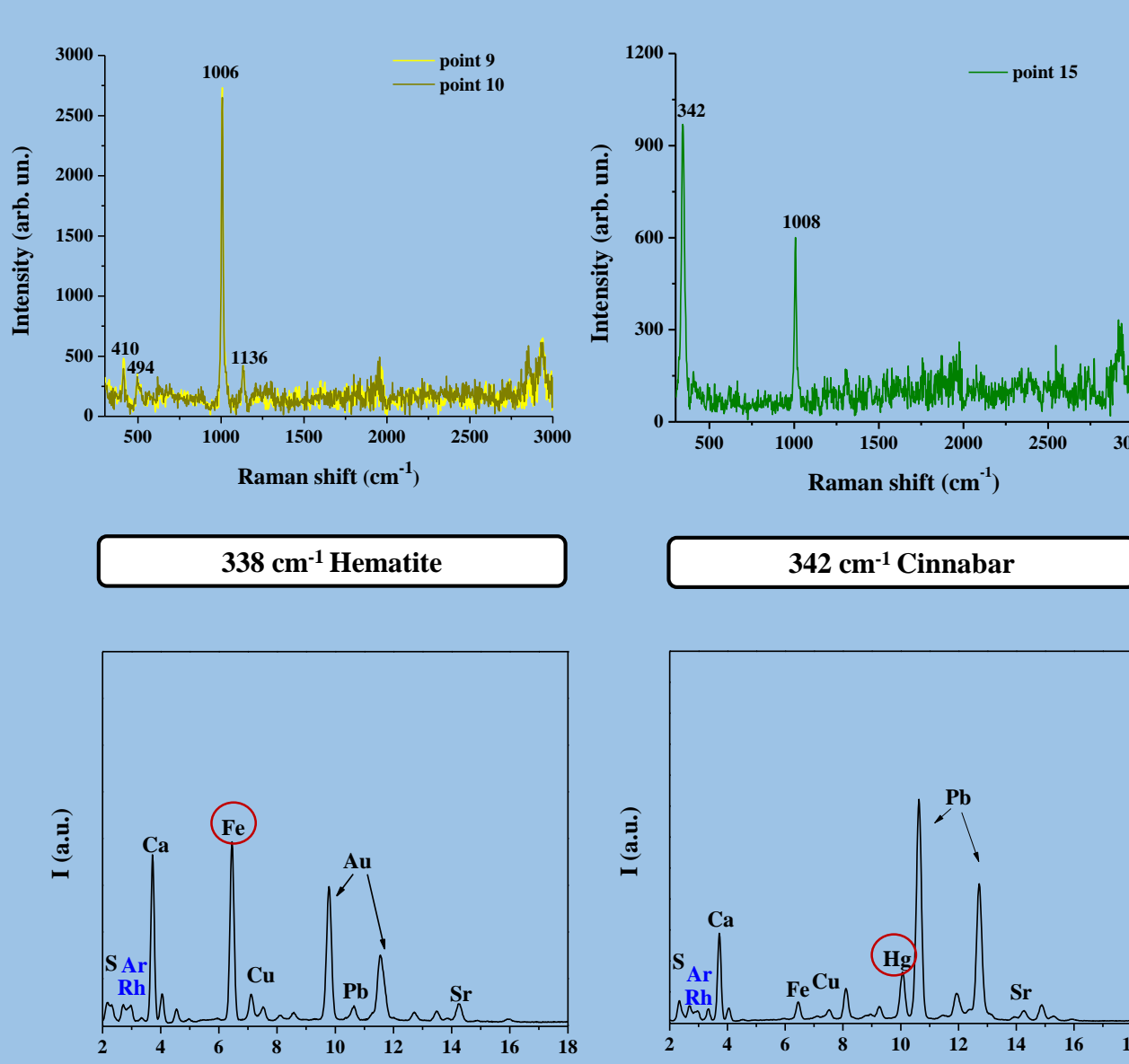
### Madonna del Rosario in trono

We observe the presence of Tin (Sn) signals in the gray pigments, indicative of the tin yellow colour, which could have been used to better reach the desired tonality. The presence of titanium (Ti) (point 21) and Gold (Au) signals (points 8 and 10) was found. The blue tones of the dress are attributable to azurite, that was confirmed by means of XRF technique with the detection of Copper.



### Madonna Annunciatà

The Raman spectroscopy highlights the presence of hematite on almost the entire table. XRF analysis suggests the presence of Lead (Pb), indicative of the white lead, used both in the white pigment preparation and glazes, and Strontium signal (Sr) ascribable to the celestite together with chalk.



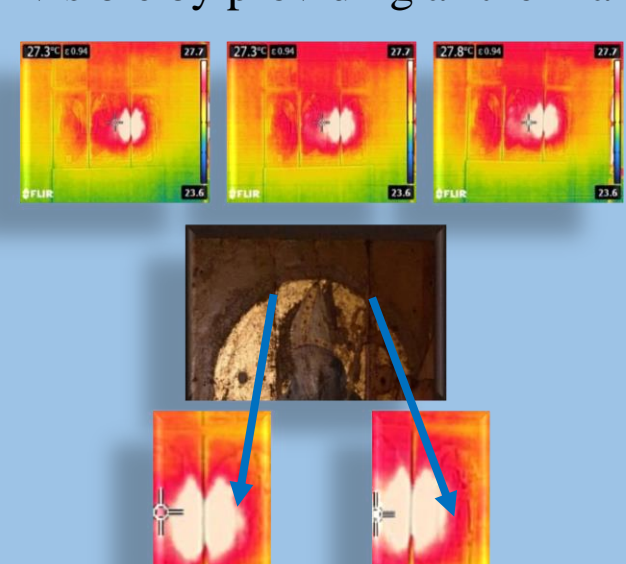
### Angelo Annunciante

The Raman spectroscopy highlights the presence of white lead in all the dress points detected and hematite in the red shaded area (point 5 and 9). The presence of Copper, noticed by means of XRF analysis, in the green sleeve (point 7) is attributable to a cupric pigment. The presence of Gold (Au) is observed in points 1, 8 and 6.

## IR Thermography

### San Benedetto

It is a non-destructive method which allows to highlight structures that are not visible by providing a "thermal image of objects".



It is very useful in the initial cognitive phases and in the study of detachments in plasters, mosaics and thin hangings. The technique was used for a mapping of sub-superficial defects of the Polyptych. The table under study shows a detachment of the right side part in the margin of the artwork, already easily identifiable to a visual analysis, and a less evident vertical one, but always visible, between a first and a second central slab of the table.

## IR Reflectography

### San Gregorio



It is a non-invasive technique, which does not damage the works and which allows to reveal the underlying layers of paintings on canvas, board or paper, in order to highlight the possible presence of preparatory drawings or subsequent restorations. In particular, in this table, as shown in the figure, a detail was found in the dress band, near the neck.

## Fluorescence UV



This technique analyzes the most superficial layers of the work, allowing information to be obtained both on the execution technique (pigments) and on the state of conservation of the artwork, such as restoration interventions (retouching and repainting). It allows to highlight the presence of transparent and little colored organic materials, such as paints, adhesive films, protective products, pictorial binders, mostly fluorescent because they are aged, or of possible biological aggressions. If performed on the paintings after that the superficial paint has been removed, it allows the identification and recognition of some of the pigments used.