

## FTIR-Imaging of a Tintoretto-Fresco

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### Background incl. aims

Molecular spectroscopy tools are employed to investigate the vibrational properties of a wide variety of samples. The chemical composition and physical properties of materials are stored in the molecular bonds and can be read from the vibrational spectrum. Fourier transform infrared (FTIR) spectroscopy has long been utilized to investigate materials present in artwork. This study of Tintoretto's work at the Scuola Grande di San Rocco (Venice, Italy) aims to understand the composition of its pictorial layers.

### Methods

The cross-section of the Tintoretto painting sample was embedded in resin to assess the five layers. The sample was analyzed in several regions using a Thermo Scientific Nicolet RaptIR FTIR microscope in corroboration with scanning electron microscopy with energy-dispersive x-ray spectroscopy. All mappings were performed in ATR mode with a Germanium micro-ATR.

### Results

The cross-section of the painting revealed the existence of a lipidic preparation layer and finishing layer. The preparation layer contains traces of proteins, pointing to the use of animal glue. The sandwiched layers contain different pigments and filler materials. The study confirmed assumptions and knowledge on the use of materials and techniques in the 16th century. In contrast, semiconductor nanostructures are state-of-the-art technology of the 21st century.

### Conclusion

All materials that were expected to be found in the paint sample were successfully identified using the Nicolet RaptIR FTIR Microscope, combined with the multicomponent search function of OMNIC Paradigm Software. The power of spectroscopic techniques is pivotal in the creation, conservation, consolidation, and understanding of materials across all scientific fields.

### Keywords:

FTIR, Imaging, Art&Conservation, Spectroscopy, ATR

**Reference:**

[1] Bravo, B.; Izzo, F.C.; Zendri, E.; Balliana, E. „Analysis of a Tintoretto stratigraphy with micro-FTIR spectroscopy,” Thermo Fisher Scientific, Application Note:56373, 2023