

Background

Art conservation is the process of repairing and maintaining the quality of works of art. To properly handle and treat the work, the composition and state of the artwork must be known. Numerous analytical techniques are used to identify key characteristics such as degradation agents, changes made to the piece, and other conservation efforts applied to the work¹.



Figure 1: The images of before and after treatment of a wall painting in Venice, Italy²

Objective

- To propose an experiment that assesses the advantages and disadvantages of two specific techniques in characterizing degradation agents: micro-Raman spectroscopy and unilateral NMR

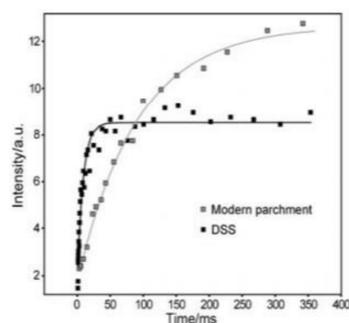


Figure 2: Unilateral NMR saturation curve of parchment paper and Dead Sea Scroll³

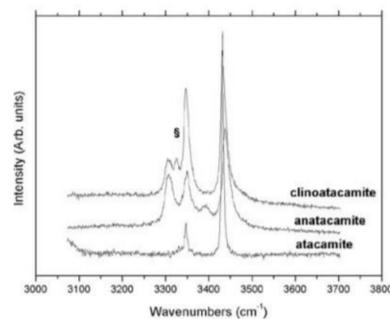


Figure 3: Micro-Raman spectroscopy of copper hydroxychlorides⁴

Analytical Techniques

Micro-Raman Spectroscopy:

- Utilizes a laser to cause matter to scatter light to create frequencies characteristic of different molecules
- Noninvasive
- Portable
- Rapid characterization of material⁵

Unilateral NMR:

- Utilizes magnetic fields to interact with nuclei and discriminate based on spin in the field
- Noninvasive
- Portable
- Sensitive and discriminative⁶

Proposed Experiment

Comparison of analytical techniques to characterize degradation agents on uniform paint pigment on canvas

Techniques investigated: micro-Raman spectroscopy and unilateral NMR

Procedure:

- Samples will contain the control or the control with a single degradation agent.
- Samples with degradation agent will be prepared over time and as organically as possible: For mold, expose artwork to a contained room with warm and humid conditions. Exposure will continue until colonies are large enough for analysis.
- Each analytical technique will be performed on the control sample and the sample containing the known degradation agent
- Data gathered will be assessed for characterization
- Experiment will be repeated for different degradation agents (oil, water with pigment)

Analysis: Quality of characterization and limitations will be analyzed to determine advantages of each analytical technique

References

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