

New Analytical Trend in Testing Paper Conservation Materials: Utilizing Miniature Spectrometers in the Lab

ABSTRACT

Chemical analysis was the only readily available method for testing materials in the conservation lab when I began a conservation career in the late 1970s. Many conservators saw reference resources such as Browning's *Analysis of Paper* as the "Holy Bible" for conducting chemical tests for paper fibers, adhesives, resins, and coatings that are associated with paper-based objects. It is still an extremely useful resource for a paper conservator, but the destructive nature of chemical analysis is a drawback. The results aren't always conclusive either, and only a very limited amount of information can be derived from such a test. Polarized light microscopy is also available, but it's a destructive technique and the resulting information is somewhat limited.

Technical analysis has come a long way since the 1970s. Progress in the 21st century has brought advances in spectrographic instrumentation, bringing conservation analysis into the realm of the practical. It has resulted in producing research-grade instrumentation that is small, compact, and relatively inexpensive, yet as sensitive in data gathering as the full-size bench top units. The pint-size instruments are also extremely simple to use. Spectroscopic analysis is nondestructive in many cases and sampling takes hardly any time at all to perform. It provides a comprehensive analysis of materials.

The paper conservation lab at Princeton University Library has acquired a number of spectroscopic instruments over the past several years that are small in size yet powerful and economical. This paper will review the practical capabilities of analytical equipment that is presently available and demonstrate their everyday use in the conservation lab. Spectroscopic techniques such as fiber optic Raman, FT-IR/ATR, FT-IR/DR, and fiber optic UV/VIS for analyzing various paper-based objects will be covered.

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