GCI Reference Collection Development

The analysis of art objects is a demanding discipline. Materials used to create art in the past are not pure, well-defined chemical compounds that lend themselves to simple scientific analysis. Typically colorful inorganic pigments were extracted from raw minerals that had different compositions or impurities based on their place of origin. Organic materials used to make dyes, binding media for paintings, and coatings and varnishes were obtained by processing natural material ranging from fresh flowers to animal bones and skins. These materials were of low purity and were often mixed, forming concoctions that offer scientists numerous analytical challenges.

Samples of commercial pigments, raw materials used in the production of pigments, various types of artist paints, and draw down samples of paints for natural aging. Photo: Dusan Stulik.

In the course of their work, scientists at the Getty Conservation Institute have analyzed art objects from a wide range of sources around the world. These objects not only present difficulty in identifying their less-than-pure components; they also display deterioration, damage, and aging, which further complicate the analytical task. In fact, a thorough analysis is almost impossible without the existence of well-characterized standards or reference materials.

The GCI Reference Collection, established in the early 1990s, is a repository of reference materials for use in the analysis of art objects. The collection supports not only various research and service tasks of the GCI Science department, but also the GCI Field Projects department, the conservation laboratories of the J. Paul Getty Museum and the international art conservation community.

The collection began with several tubes of paint and a few bottles of raw materials typically used to make paints: pigments, resins, gums, oils, and waxes. Since this simple beginning, the collection has grown into more than thirteen thousand materials, which are housed in a dedicated, environmentally controlled room.

Art Kaplan, coordinator of the GCI Reference Collection, cataloging samples in the reference collection database. The database currently has over 16,000 samples. Photo: Dusan Stulik.

The collection contains a wide variety of inorganic and organic pigments and dyes; raw plant and mineral samples; well-characterized wood samples; stone samples; drying oils; natural and synthetic resins; waxes; prepared media; varnishes; and different protein-based materials, among other things. Examples of various photographic processes and photographic materials from the era of chemical photography are also part of the collection.

The collection continues to grow through purchases by the GCI, as well as through donations by individuals and institutions. In 2007 the Getty appealed to the public for their help in building an archive of photographic materials from the pre-digital age. The goal was to create a repository of materials from the chemical photography era before these historic materials are completely supplanted by digital photography. Since its initial request, the GCI Reference

Collection has received dozens of donations, from all over the world, containing hundreds of items of photographic materials, which are no longer commercially available. Included in these donations were photographic papers, films, plates, and prints from throughout the twentieth century.

The GCI Reference Collection Database

The collection is catalogued using database software that allows searching for information about specific samples or the collection as a whole. Each sample has a unique record, with information ranging from chemical composition to manufacturer and geographic origin to experiments that have been performed on the sample. In addition, links are provided to analytical data obtained from the analysis of the samples. This valuable resource for researchers at the Getty ultimately will be shared with conservators throughout the world.

Binding media, including natural oils, glues, waxes, and eggs. The collection also contains a wide selection of raw materials used to produce binding media. Photo: Art Kaplan.

Collection of photographic materials containing well-defined and well-described samples of different historical photographic processes, with their analytical signatures. The collection also contains a large selection of sample books and commercial photographic materials, as well as different types of photographic toners and coatings. Photo: Dusan Stulik.

Collection of binary mixtures of binding media, an important tool in developing various analytical methodologies for analysis of artifacts. More than 900 samples were prepared using combinations of different binding media in concentrations ranging from 0.1%–99.9%. Photo: Dusan Stulik.

High resolution digital photos are taken of all samples, along with a color test patch. This allows any user to calibrate their monitor in order to accurately view the sample in its "true" colors. Photo: Dusan Stulik.

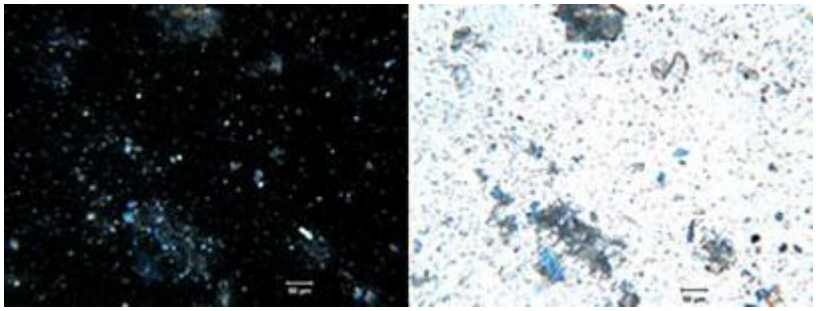
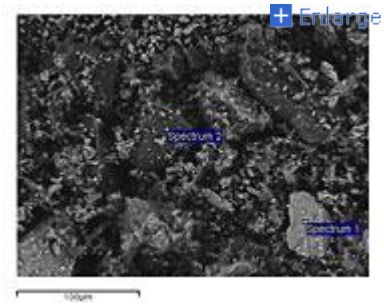


Image of an azurite pigment sample, PIG15451, obtained using darkfield and brightfield polarizing light microscopy.

Enlarge



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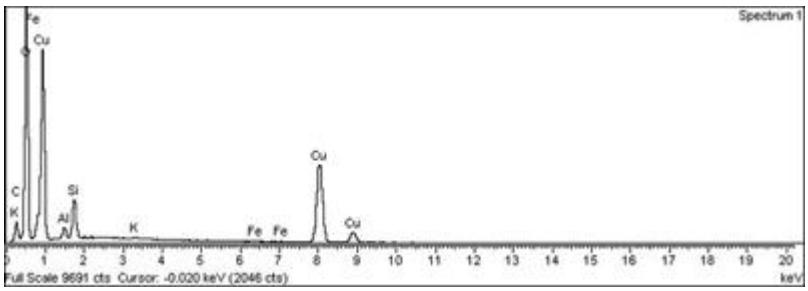
Environmental scanning electron microscopy (ESEM) image of an azurite pigment sample, PIG15451, showing where individual spectra were obtained.The ESEM allows the viewing of samples at a magnification much higher than what is possible with conventional light microscopy technniques.



Eneregy Dispersive X-ray spectrum obtained using the ESEM of an azurite sample, PIG15451, showing the presence of aluminum, silicon, potassium, iron, and copper. The technique gives information on the inorganic componenets in a given sample.

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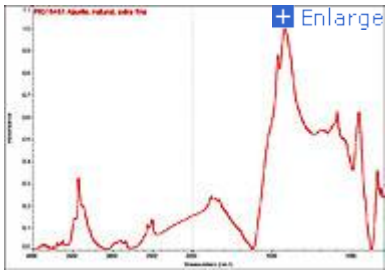

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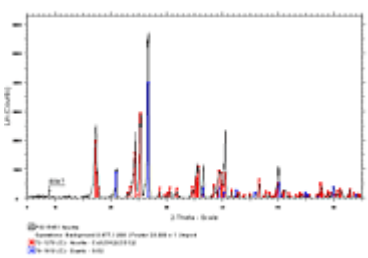
Fourier Transfor Infrared Spectrum (FTIR) obtained for an azurite sample, PIG15451. FTIR provides information on organic molecules and functional groups found within a sample.



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X-ray diffractogram of an azurite pigment sample, PIG15451. X-ray diffraction is a technique that provides information on the crystalline structure of a sample. Each diffractogram is unique to each crystalline solid and can be used as a fingerprint for the identification of various materials.