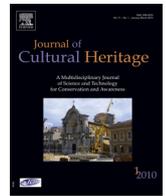




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## Foreword



Modern and contemporary artworks are characterized by the great freedom of the artists in finding new ways of expression, especially by using the huge variety of materials available on the market. New materials have often been combined together and with traditional artists' ones, resulting in many possible combinations and in new forms of interactions, and consequently in new forms of deterioration of the artefacts. This feature represents a great challenge both for conservators and for heritage scientists. In this *Special Issue on Modern and Contemporary art*, a representative selection of papers has been made to give an overview, though not exhaustive, of the complexity of materials, techniques and problems for the conservation that the modern and contemporary artworks present. The Special Issue highlights also the importance of different analytical approaches, both non-invasive and micro-invasive, for the knowledge of the artistic techniques and the used materials and the understanding of the occurring phenomena.

A multidisciplinary methodological approach, including the analysis of the artist's materials, through both in situ non-invasive and micro-invasive techniques, was used to ascertain the authenticity of a Picasso's painting, whose attribution is still unresolved, in *Violon. Céret by Pablo Picasso: The case of a lost painting. A methodological approach* by Eleonora Maria Stella et al. The results demonstrated the compatibility of the constituent materials of the painting with its period of creation – in the year 1912 – confirming the results of expert opinions based on stylistic data and study of documentary sources.

A different problem of attribution, solved through a multi-analytical approach, is described in *How do you say "Bocour" in French? The work of Carmen Herrera and acrylic paints in post-war Europe* by Federica Pozzi et al. In this paper the materials, in particular the binding media, of the Cuban-American artist Carmen Herrera were investigated. The results are particularly remarkable because a complex progression of organic binders was uncovered: mixtures of modified oils, detected in the first paintings, were gradually replaced or combined with other binding media, such as acrylics, polyvinyl acetate, and oil-based alkyds, in later works. Remarkably, the first occurrence of acrylic binders was observed in a painting dated to 1949, well before the date of introduction to the European market of the first acrylic-based paints by George Rowney and Sons in 1963.

Synthetic organic pigments have been used in paintings for well over 130 years. Historical pigments are synthetic organic pigments that were used by artists but are no longer commercially produced; they are of particular interest to art historians and conservators because, if identified in a painting, they can provide valuable

information about artist materials and methods. Suzanne Quillen Lomax et al., in their work *Historical azo pigments: Synthesis and characterization*, synthesized and characterized a series of azopigments, specifically members of the pigment classes: arylide (Hansa) yellow, diarylide yellow and oranges, as well as the red Naphthol AS, providing important references for future studies.

Instead Laura Fuster López et al. in *"An insight into the mechanical properties of selected commercial oil and alkyd paint films containing cobalt blue"* performed an in-depth investigation into the role of cobalt blue pigment in the mechanical properties of some modern paint films by studying selected commercial oil and alkyd paint films containing cobalt blue. Actually, pigments and binders are known to influence drying and ageing mechanisms of paint films but the study of the long-term mechanical behaviour of paint films and its relationship with paint degradation and conservation still needs further investigation. This research highlights several factors associated with the chemical composition of the studied paints which likely are the responsible for the different observed mechanical behaviour, such as the presence of drying or semi-drying oil, fillers and mixtures of pigments.

Paintings and painting materials are generally the most studied, compared to other kinds of execution techniques. For instance, although many prominent artists have experimented with pastels, this technique has been the subject of very limited scientific research. To fill this void, the work by Francesca Modugno et al. *Chemistry of pastels: investigation of the organic materials in a drawing by Umberto Boccioni* proposes an analytical approach based on chromatography and mass spectrometry to investigate the composition of the pastels used by Umberto Boccioni in a drawing dated 1908 and conserved at the Museo del Novecento in Milan (Italy). The analysis highlighted the presence of proteins and plant gums in micro samples from a drawing by the Italian artist, with differences in the composition for the different samples.

Other little investigated materials/techniques are the felt-tip pens, used by many artists in the last 50 years. In *Disclosing the composition of historical commercial felt-tip pens used in art by integrated vibrational spectroscopy and pyrolysis-gas chromatography/mass spectrometry* by Costanza Miliani et al., the authors study the formulation of 20 Johann Faber felt-tip pens commercialized in the 1960s, used by the architect and designer Lina Bo Bardi, by an integrated analytical methodology. The comparison between the early and more recent commercial felt-tip pens allowed to differentiate dyes, pigments and binders, which may provide a useful reference for future studies on the chemical characterization of historical samples.

Plastics can be typically found in many different works of arts, design objects and daily objects.

A very interesting example is presented in *Elucidating the composition and the state of conservation of nitrocellulose-based animation cells by means of non-invasive and micro-destructive techniques* by Francesca Caterina Izzo et al., where the authors report the first study on Rodovetri, animation cels produced between the 1950s and the 1970s for the Italian television and conserved at the Museum of Industry and Labour “Musil” (Italy). Although these cels are considered as works of art and witnesses of Italian animation design, they have never been studied before. The results, which were obtained by means of a multi-analytical non-invasive and micro-destructive approach, underline the composition of the plastic substrate (nitrocellulose) and of the painted layers. This study also provides information on their state of conservation, in particular in relation to the de-nitration of plastic sheets. Important issues on the preventive conservation are also raised.

To help developing preventive and conservation strategies for museum objects made of cellulose ester plastics is the goal of the analytical *Investigation of cellulose nitrate and cellulose acetate plastics in museum collections using ion chromatography and size exclusion chromatography* by Joy Mazurek et al. Ion chromatography, size exclusion chromatography, and gas chromatography/mass spectrometry were employed to measure nitric and acetic acids, molecular weight and plasticizer content. The degree of substitution and degree of polymerization for cellulose ester plastics were determined and compared to condition surveys.

Not only materials used by the artist can be investigated but also the restoration treatments are the object of study to evaluate their performance and long-term efficacy.

A nice example is represented by *Digging into the past of nature carpets. The evaluation of treatments on artworks by Piero Gilardi made from polyurethane ether foam* by Carien van Aubel et al., which evaluated two treatments performed 10 and 20 years ago on two artworks made of flexible polyurethane ether foam (PUR foam) by Piero Gilardi; *Natura Morta* (1967) and *Zuccaia* (1991). The condition of an untreated nature carpet *Cavoli e Neve* (1967, 1988) was used as a control reference. This study showed that the effectiveness of the former treatments was best assessed by the measurement of the cell strut size and empirical research. The past treatments proved to be very successful and can therefore be suggested for similar artworks.

Actually, even if some of the works of art were made only some decades ago, many of them show signs of deterioration. As previously written, the combination of different, unpredictable materials and their interaction with the environment could produce also new forms of deterioration or increase the speed of some phenomena.

In *Changing surface features, weeping and metal soap formation in paintings by Karel Appel and Asger Jorn from 1946–1971* by Ida Antonia Tank Bronken et al., the authors report the results from ongoing investigations of soft and dripping oil paint in art works by CoBrA's Karel Appel (1921–2006) and Asger Jorn (1914–1973). The paintings were chosen to represent a large variety of

conditions: some with slightly soft and mainly stable paints, and others with deforming and dripping paints. The softening paints and drips on the surface of some of these paintings show similar polarity features with mid-chain functionalized stearic acids and azelaic acid moieties. The findings show that there are several physical and chemical alterations within one degradation symptom that have to be understood when conservation treatments are considered in the future.

Degradation phenomena can derive by different physical and chemical alterations occurring inside the components of the work of art or can be the effect of the interaction with the surrounding environment.

In *Conservation of Contemporary Art: alteration phenomena in a XXI century artwork. From contactless in situ investigations to laboratory accelerated ageing tests* by Luca Nodari et al., the authors report the results of a combined approach in investigating the alteration phenomena on a contemporary artwork, *Senza Titolo*, by Nunzio di Stefano. The oeuvre, created in 2001, is composed by seven lead carved panels coated with Paraloid B72. The lead alteration products formation, attributed to VOCs attack during the storage in wood boxes, were studied by means of ERFIR and micro-FTIR and the process investigated in detail.

Another interesting example of interaction of artefact with the environment, in this case an outdoor work of art, the Oslo Opera House, is described in *The deterioration of Apuan white marble in contemporary architectural context* by Francesca Gherardi et al. The Oslo Opera House is a high-standing contemporary architecture (opening 2008) characterized by a large ornamental pavement mainly made of Apuan marble slabs. After a few years, large parts of the marble surface suffered from a marked yellow discoloration and dirt accumulation. In this context, the research was carried out aiming at assessing the state of conservation of the marble slabs and investigating the causes of their discoloration. The state of conservation gathered was the starting point for the development of a tailor-made cleaning methodology of the marble cladding and a complete revision of the protective treatments and ordinary maintenance protocol.

From the summary of the Special Issue, it can be understood how the chosen articles present a great variety of approaches and challenging discussions about different aspect of heritage science and conservation. For this reason, we believe that this Special Issue will be of great interest for many readers of the *Journal of Cultural Heritage*, not only those specifically involved in modern and contemporary art.

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