

# ANALYSIS OF PIGMENTS USED IN A JAPANESE PAINTING

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## ABSTRACT

Materials used in a Japanese painting were analyzed directly and nondestructively by X-ray fluorescence spectrometry and X-ray radiography. A pair of six-panel folding screens entitled *The Irises Screens* by Ogata Korin, a National Treasure of Japan, was examined. A scientific approach had never been incorporated into its investigation, and its materials and techniques had remained unknown. It had been previously believed that this folding screen used only two types of coloring materials, blue-colored azurite and green-colored malachite, but this investigation revealed that three types of materials were used for each color.

## INTRODUCTION

Recent years have seen an increasing number of cases where a variety of analysis methods have been introduced to investigate the materials and coloring techniques of works of art, such as paintings and sculptures. In some cases, chemical analysis is performed on object fragments and paints peelings. In Japan, however, “nondestructive, no-contact analysis” is almost always the chosen technique for the protection of invaluable works. This “nondestructive, no-contact” restriction narrows down the number of investigative options available, leaving researchers to resort to methods which utilize radioactive and infrared rays. Among the X-ray-based analysis methods most widely used in the investigation of artwork are X-ray fluorescence spectrometry (XRF) and X-ray radiography [1–3]. Compact portable devices featuring each of these two techniques have been developed since the 1990s, making it possible to carry out on-site investigation within a museum, without actually having to move the objects themselves [4–7].

This report describes the findings of an investigation into the materials used in the *Irises* screens (National Treasure of Japan) by Ogata Korin (1658–1716), which is among the most well-known paintings in Japan. A scientific approach had never been incorporated into its investigation, and its materials and techniques had remained unknown. For the purposes of this investigation, a high-definition digital camera was used to take photographs of the painting’s surface for close observation, and an attempt was made to identify its materials by utilizing such techniques as XRF and X-ray radiography.

## THE *IRISES* SCREENS

A property of the Nezu Institute of Fine Art, Tokyo, Japan, the *Irises* screens (Figure 1) is a pair of six-panel folding screens measuring 150.9 × 338.8 cm each created by Ogata Korin, and is one of the artist’s most important works. With its superb composition and décor being highly appreciated—portraying a cluster of irises with blue petals and green leaves against a gold background—this is also one of the representative paintings of Japanese art.









