D/MAX RAPID II with CMF and RINT - Ultima III at Tokyo University of the Arts.

Professor Fumiyoshi Kirino in the Graduate School of Conservation for Cultural Property uses his materials analysis expertise to investigate suitable methods for the conservation and restoration of cultural properties. For his research, he uses the Rigaku Ultima III X-ray diffractometer, the D/MAX RAPID II with CMF optics, X-ray fluorescence, electron microscopy, and Infrared and Ultraviolet spectrometry. He needs to know the basic elemental composition of materials, as well as their atomic structures. For the restoration and preservation of cultural assets, he studies how materials change over time. Using a variety of analytical instruments is crucial to the success of his studies.

Original work in Edo era.

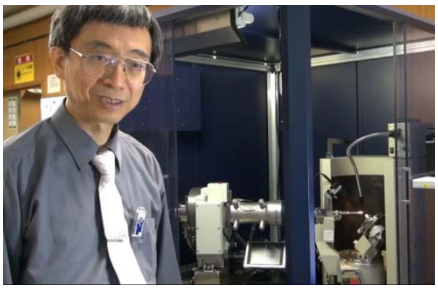
Image by infrared

Image of UV fluorescence

Reproduction CG

The Ultima III, a multipurpose powder X-ray diffractometer equipped with a high-speed detector, is suitable for analyzing metal surfaces and the thin layers of rust that can form on them. By attaching a small angle scattering unit, the Ultima III can also be used to estimate the size distribution and crystallinity of paint particles using X-ray dispersion.

Since the Ultima III can only be focused to an area of approximately 50 microns, Professor Kirino uses the D/MAX RAPID II with focusing CMF optics, which can focus X-rays to 10 microns, to study micro-regions, such as a single particle of paint. In addition, this device can measure residual stress caused by a change in the atomic structure of the sample. This is useful to understand ancient casting techniques. Though these are both X-ray diffraction devices, their individual characteristics broaden his ability to investigate the constituent materials of cultural assets in detail.



Reference Application Note:
XRD 1005: Qualitative analysis of a trace amount of pigments used in Japanese painting.

Prof. Kiriono with the D/MAX RAPID II with CMF

Reported by Yurika Takumi, 2015 April.