

Proposal 01-01-880

Characterization of pigments in wall paintings from two medieval period Ethiopian Churches using SR-XRD and Micro-Raman Spectroscopy

The HRXRD and Raman measurements were carried out using the facilities of SNBL's station B during the period 23rd – 29th May 2012. Different layers of 15 painting cross-sections of samples collected from the wall paintings of two churches (12th century and 13th century Yemrehana Krestos and a Genete Mariam, respectively). The measurements were carried out using 24.9 keV beam (0.50 Å).

The Raman measurements were performed using SNBL's Renishaw Raman spectrometer. The power of the laser beam was adjusted by means of a set of filters that allowed the power of the beam to be adjusted to an appropriate fraction. The wavelength employed was 785 nm.

The quality of the HRXRD data is good and we are in the process of identifying the different pigments, plasters, extenders, and degradation products. These experiments coupled with results from complementary techniques from prior experiments are enabling us to identify compounds even in relatively low concentrations. Work on identifying the physical and chemical processes that alter and disfigure portions of the paintings is ongoing. Although the measurements were performed only a short while ago we already have gleaned important information that is relevant to well-informed conservation interventions.

We realize that we should also carry out experiments using a focused beam. This would significantly improve the spatial resolution of the diffraction data. This aspect is very important given the very inhomogeneous character of the samples and their small size (100 – 500 microns). Such measurements would build on those reported here.

We are very satisfied with the facilities offered by SNBL and the generous expertise provided by the staff.