

# Synchrotron radiation on the traces of famous painters: XRF analyses of silverpoint drawings by Dürer, Holbein, Van Eyck and Rembrandt

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In our days, artists have a large panoply of drawing materials at their disposal. But when you search for drawing materials used by Renaissance's artists in Europe only little information is available. Nearly no ancient drawing instruments are conserved. Therefore, the only possibility to get insights into former drawing techniques is the analysis of the drawings themselves.

The use of silverpoints for drawing is one of the most delicate and precious drawing techniques. In some primary work, about seventy drawings by mainly Italian, but also Flemish and German artists were analysed using external beam micro-Proton induced X-ray emission ( $\mu$ -PIXE) in order to get more information on this drawing technique and to define new criteria for comparison of drawings of unknown origin [1]. In the frame of a French-German cooperation, about 25 further drawings were investigated using spatially resolved Synchrotron induced X-ray fluorescence (SR-XRF) analysis at the BAMline at BESSY. Indeed, the analysis of drawings requires particular attention because the study has to be fully non-destructive and extremely sensitive. The metal alloy on the paper does not exceed some hundreds of  $\mu\text{g}/\text{cm}^2$ . Therefore, surface sensitive  $\mu$ -PIXE and SR-XRF are particularly well suited for the analyses of silverpoint drawings.

Here, we report new analyses of a series of silverpoint drawings that were made by Albrecht Dürer [2], Jan van Eyck [3] and even Rembrandt as well as those originating from the workshop of Hans Holbein the Elder. The latter drawings show the specificity that they were realised with metal points but also highlighted with red and white pigments and overdrawn with inks or gouaches. Various inscriptions and lead strokes are also present. The investigated drawings are kept today in the drawing cabinets of the State Museums of Berlin and of the State collections of Dresden.

The study of these drawing series permits to differentiate the drawing materials, to better understand the drawing technique and to give new insights into the genesis of some drawings.

## References

- [1] - A. Duval, H. Guicharnaud, J.C. Dran, Nucl. Instr. Meth. B 226, 60, (2004)
- [2] - I. Reiche, A. Berger, W. Görner, S. Merchel, M. Radtke, J. Riederer, H. Riesemeier, M. Roth, Nucl. Instr. Meth. B 226, 83, (2004)
- [3] - I. Reiche, A. Berger, W. Görner, T. Ketelsen, S. Merchel, M. Radtke, J. Riederer, H. Riesemeier, M. Roth, Spectrochim. Acta B 59, 1657, (2004)