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P52 - Paintings on copper by the Flemish artist Frans Francken: PIXE characterization by external micro beam

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The use of copper as support for oil paintings had its major expression in the XVI century, at first in Italy and then in the Netherlands, probably due to the interest that artists revealed for painting on unconventional supports and also due to the accessibility of copper plates for etching, engraving and enamelling [1]. Copper offers a flat and rigid surface, where it is possible to perform more detailed images than in a traditional canvas or wooden support, providing also a particular finishing and colour brightness.

Through the external beam micro-PIXE analysis of three paintings dated from the XVII century and attributed to the Flemish artist Frans Francken, the present work aims to contribute to the study of the painting materials used by the painters in this type of support. The experiments were performed using a 2MeV proton beam at the external proton beam set-up installed at the CTN/IST [2]. The beam, with dimensions of 70x70 μm^2 , can raster a surface of 800x800 μm^2 .

Several spots in each of the paintings were chosen for analysis in order to cover almost all the pigments used in the colour palette and at the same time highlight some of the painting techniques used. Lead was detected in almost all the analysed regions and its distribution is usually presented as small agglomerates. In previous works lead has been related with the presence of lead white, used as ground layer [3]. Regarding the colours composition, preliminary results point to specific combination of elements in the characterization of each colour. For example, the red colour or carnations exhibit a high concentration of Hg and S, suggesting the use of vermillion.

Small quantities of gold were also detected in two of the three paintings: in "The conversion of the gentiles" the gold is restricted to the Christ's halo, while in "Marriage at Cana", gold was also detected in a wall drapery pleats. Gold was usually employed on renaissance paintings to embellish some details of the representations [3].

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[1] "Copper and Bronze in Art", Scott, D. "Copper as Canvas: Two Centuries of Masterpiece Paintings on Copper, 1575-1775"; Phoenix Museum of Art

[2] V. Corregidor et al. e-conservation, 22 (2011)

[3] A. Pitarch, Anal. Bioanal. Chem., (2011), 10.1007/s00216-011-5368-6

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