The Production History of Naples Yellow and the Discoloration of the Blue Pigment Smalt

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Naples Yellow, or lead antimonate yellow, is the most important synthetic yellow pigment in the history of the visual arts. The usage of lead antimonate covers a period of more than 3500 years, the first application of the pigment dating back to the 18th Egyptian dynasty (ca. 1500 BC). The production history of the pigment, notably over the past few centuries, is rather diverse and not well understood. Our research focussed on the European history of the pigment from the 16th to 19th century. The aim of this study was to analyse and reproduce different manufacturing methods and subse-quent1y to characterize the different forms of lead antimonate used at different periods in time. This approach may lead eventually to a tool in authenticity studies. Contemporary recipes, describing the synthesis of lead antimonate yellow, have been reproduced with modern means. Many pigment samples, also from collections, were subjected to extensive analysis, including synchrotron as well as laboratory-based powder XRD and single crystal electron diffraction.

The discoloration phenomenon of the blue painting pigment smalt has been studied using several analytical methods. The paintings of the Dutch painter Hendrick Ter Brugghen (1588-1629) show severe signs of smalt discoloration, a dramatic example of which is the painting *St. Luke* (1621). Based on neutron activation and autoradiography a digital reconstruction could be made showing the approximate original appearance of *St. Luke*, of which pictures will be shown.

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