

## It's only a part of the story: an investigation into the dyes used on the *Privilegium maius*

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The *Privilegium maius* is one of the most famous and most spectacular forgeries in medieval Europe. In 1156 Austria became a duchy. For this solemn act emperor Friedrich I Barbarossa issued a charter with a golden bull for the ruling family in Austria, the Babenbergs. But two centuries later duke Rudolf IV, a member of the Habsburg family, commissioned a forgery of this charter and of four others. He wanted to elevate the rank and the prestige of his family and to show that they at least equalled the electors of the Holy Roman emperor. These five charters are kept now in the Haus-, Hof- und Staatsarchiv Department of the Österreichisches Staatsarchiv in Vienna. Since almost 200 years it is known that the documents are false: due to their inner and outer characteristics, historians have been able to see through the albeit excellent forgeries.

To shed light on the controversial story of the *Privilegium maius* charters, these documents have been recently subjected to a diagnostic study that involved the different parts they are made of. These are the parchment support and the text they were written with, the beeswax seals linked to the document and the coloured threads that link the seals to the document.

The present contribution concerns the dyes used to impart the colour to the threads: are they compatible with the presumed age of the charters? If not, when were they applied? Though showing only a part of the whole story of the charters, dyes analysis could contribute in assessing the complex history of their manufacturing. Firstly, non-invasive *in situ* measurements were carried out by means of FORS and spectrofluorimetry analysis, to have a preliminary identification of the dyes. With concern to red hues, this allowed classifying the threads into three groups: 1) dyed with orchil, 2) dyed with an anthraquinonic alizarin-like dye and 3) dyed with a modern colourant. Samples from the threads were then taken to perform micro-destructive measurements by means of Surface Enhanced Raman Spectroscopy (SERS) and HPLC-MS analysis. This allowed confirming the presence of orchil in the first group, while the members of the second group resulted to be dyed with artificial alizarin instead of madder, according to the presence of synthetic by-products. The third group resulted to be coloured with PR14, a modern azo pigment. It is apparent that most of the threads have been reworked in recent times. Work is in progress in order to characterise all the dyes, including green and yellow ones, and to try to locate the different stages of the intervention on the colouring of the threads.