
Study of the amber chromophore: application to stained glass coloring

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Abstract

A method used for a long time to color the stained glass in yellow is the use of a chemical complex of iron and sulfur, also called "amber chromophore". Studying this chromophore allows a better understanding of the color of stained glass but also a better knowledge and control of the amber coloring for UV protecting bottles.

However, the study of this chromophore in stained glass has long been difficult. Indeed, iron and sulfur are often present in these glasses as impurities, whatever their coloration. Only very precise redox conditions make it possible to obtain the pure yellow to amber color. In addition, a very low concentration of iron and sulfur is necessary to give the yellow color, making it difficult to determine the coloring element simply using chemical analysis.

The spectroscopic methods and in particular optical absorption spectroscopy take thus, all their senses for this study. Moreover, the use of a portable spectrophotometer is perfectly suitable to quickly identify the chromophore responsible for the yellow color without any direct contact with the glass. Raman and EPR spectroscopy were also used to better understand the structure and the very specific oxidation state of this chromophore.

Keywords: Silicate glass, Color, Optical spectroscopy, Cultural heritage, Redox

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