

Non-invasive investigation of organic materials – between theory and practice

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Non-invasive investigation (investigation without sample withdrawal) is an essential demand in the study of museum objects. Organic materials in these objects – paper, leather, parchment, textiles of vegetal and animal origin, fur, binding media and varnishes, wood, bone, amber etc. are composed of cellulose, collagen, keratin, fibroin, tannins, gums, oils, resins which may be grouped in some classes of compounds, all based on the same elements: C, H, O, sometimes N and S. Other organic compounds, such as dyes, mainly composed of the same elements, may be also added to these objects.

The main demands of organic based museum objects investigation refer to identification of organic materials in paintings (binding media varnishes), analysis of cellulose based materials and the compounds used in their restoration, identification of natural dyes in textiles, evaluation of parchment degradation, establishing criteria to distinguish between ambers of different origins. The methods mostly used to answer the above-mentioned demands are infrared, UV-Vis and Raman spectroscopy, liquid and gas chromatography and thermal analysis. Except for the spectroscopic techniques which may be used non-invasively, for all the other methods sample withdrawal is necessary.

The presentation discusses, based on some case studies, how is possible to obtain detailed information on organic materials in museum objects by non-invasive investigation and justifies the need to develop studies capable to diminish the amount of sample need for micro-destructive analytical techniques so that to further contribute to reduce destructiveness of organic based museum objects.