

## Non-Invasive Techniques of Analysis of Painting in Forensic Fields

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**Abstract :** A growing market with modern artworks of a high price leads to the creation and selling of artwork counterfeits. Material analysis is an important part of the process of assessment of authenticity. Knowledge of materials and techniques used by original authors is also necessary. The contribution presents possibilities of non-invasive methods of structural analysis in research on paintings. It was proved that unambiguous identification of many art materials is feasible without sampling. The combination of Raman spectroscopy with FTIR-external reflection enabled the identification of pigments and binders on selected artworks of prominent Czech painters from the first half of the 20th century - Josef Čapek, Emil Filla, Václav Špála and Jan Zrzavý. Raman spectroscopy confirmed the presence of a wide range of white pigments - lead white, zinc white, titanium white, barium white and also Freeman's white as a special white pigment of painting. Good results were obtained for red, blue and most of the yellow areas. Identification of green pigments was often impossible due to strong fluorescence. Oil was confirmed as a binding medium on most of the analyzed artworks via FTIR - external reflection. Collected data present the valuable background for the determination of art materials characteristic for each painter (his palette) and its development over time. Obtained results will further serve as comparative material for the authentication of artworks. This work has been financially supported by the project of the Ministry of the Interior of the Czech Republic: The Development of a Strategic Cluster for Effective Instrumental Technological Methods of Forensic Authentication of Modern Artworks (VJ01010004).

**Keywords :** non-invasive analysis, Raman spectroscopy, FTIR-external reflection, forgeries

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