

Pigments and organic binders from Rila monastery wall paintings identified by the application of a spectral database

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Abstract

The complex nature of painting materials - mixture of mineral and organic components - usually requires the application of a specific approach for identification based on several instrumental techniques [1]. Alterations in the composition due to natural aging and changes in the environmental conditions cause additional difficulties in the identification of painting materials [2, 3]. The use of an appropriate spectral database could considerably facilitate the identification, especially when spectra from real samples are provided along with the reference materials.

Recently we have developed a spectral database of art and archaeological materials providing information on a number of pigments and dyes, adhesives, oils, resins, gums, bulk components, fillers, mixed materials, archaeological and art work samples [4]. The database is mainly focused on absorption FTIR spectra, total attenuated reflectance (ATR) spectra and Raman spectra as these spectral techniques are widely employed in the identification of art and archaeological materials.

Herein we report the identification of several pigments and organic binders originating from the wall paintings in "St. Nikolay" Chapel, main church "The Nativity of the Virgin" of Rila monastery complex. The wall paintings were painted by Dimitar Zograph and his son Stanislav Dospevsky. Identification was achieved through ATR measurements and spectral database application. Paint samples contained predominately ochre and green earth pigments with egg binder. Among the green paint samples, emerald green mixed with egg was recognized, showing a good match with a previously studied sample from the altar. The blue paint contained smalt mixed with carbohydrate binder.

Key words: pigments, binders, spectral database, Rila monastery.

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