

TG-FTIR: Analysis of organic and inorganic components in plasters, mortars and wall paintings

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Since ancient times, it has been known that the physical and structural characteristics of plaster and mortars are determined by their different components. By studying materials produced in the same place, during different historical periods, it is possible identify different methods of working in the building manufactory corresponding to the technology and economy of the society of the time.

The chemical characterisation of the plaster and mortar components can be useful for dating, and can be of great interest when choosing compatible restoration materials.

It is well known that both in plaster and mortars, moreover in wall painting, organic media of various vegetable origins were commonly used either as glues or as binders or as additives. From early times the masterpieces used honey, starch and plant gums. In the modern time the additive organic part is used to give specific behaviour to the mortars.

It can be useful to find a technique that allows one to obtain quantitative and qualitative data on the organic and inorganic composition of these kinds of materials, compared to classical analytical techniques as chromatography.

As it is already known, differential thermal analysis (DTA) and the thermogravimetry (TG) are two of the most powerful techniques that can be used in the study of plaster and mortars.

In particular, TG produces quantitative data about the composition of the material in interest while using a very small amount of sample.

It is also known that the TG curves are subjected to different interpretations. In order to interpret correctly the composition of the materials using TG, similar to results obtained with other analytical methods, it can be useful to combine the thermal analysis with FTIR spectroscopy, which is a rapid and sensible technique.

In this work, the preliminary results obtained on laboratory samples and on some ancient plasters are reported.