

Thermography in the investigation of gilding on historical wall paintings

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In the area of investigation on historical wall paintings new methods are continuously sought to enable non-destructive evaluation of the state of preservation of original paint layers covered by whitewash or over-painting.

The authors have applied thermography to the investigation of gilding covered under paint layers. Research that provided positive results were published and continued. At the present stage it was assumed to confirm the efficiency of thermographic methods for the examination of the state of preservation (or destruction) and the distribution of the gilded areas of wall paintings.

At the beginning, passive and active thermographic methods were applied to analyse a model simulating a multilayer paint structure. Circular gilded samples were put on plaster to imitate nimbuses of the characters frequently represented on mural paintings. Some samples were subjected to mechanical ageing. Next, the gilded zones were covered with whitewash and polychromy. The aim was to determine the conditions of thermographic measurements and the feasibility of evaluation of the state of deterioration of the gold fragments.

A Reytheon Controll IR 2000B camera was applied, that operates in the range of 7-14 μ m at 240-320 pixel resolution. Two 1000W halogen lamps were used to heat the model. ThermalScope software was applied to record the data.

The given experimental conditions allowed to localize the gilded areas covered with whitewash and polychromy and to distinguish between the deteriorated and well preserved zones. Thus, it has been confirmed that thermography can prove to be most helpful at the analysis of original wall paintings. This was also confirmed when applied in-situ on historical monuments.

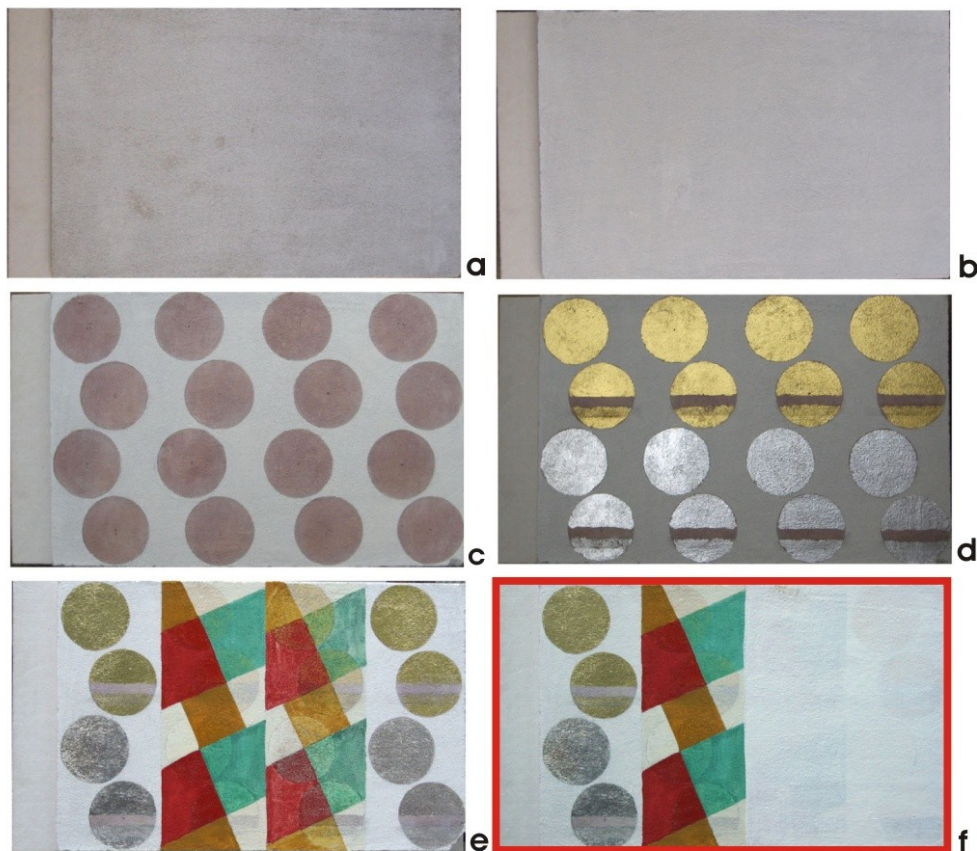


Fig. 1. Stages of preparing the model for the investigation, layer 2 – plaster, layer 3 – internal paint, layer 4 – insulation, layer 6 – gold and silver folio (party damaged), layer 7 – polychromy, layer 8 – outer paint on the right.

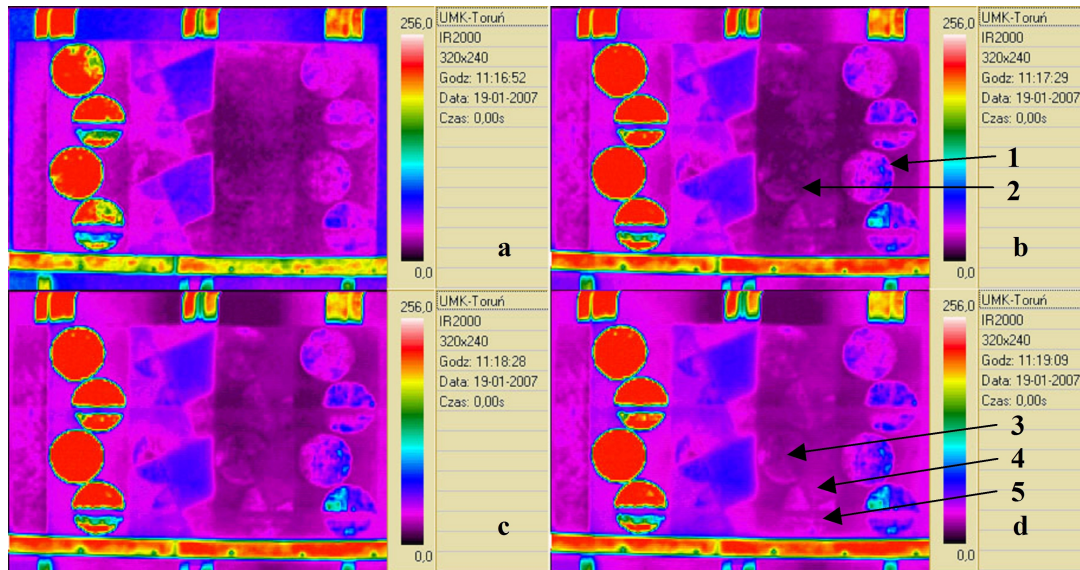


Fig. 2. Thermal images registered during the heating process