

Laser-Induced Breakdown Spectroscopy for the analysis of model samples of historical paintings

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Laser-Induced Breakdown Spectroscopy (LIBS) has a high potential in the analysis of the objects of cultural heritage¹. However it is a microdestructive technique and it is essential to optimize effects of laser-matter interaction and laser ablation on the particular material under investigation. Model multilayered samples containing traditional pigments were prepared on a wooden support (5 x 10 cm) with each layer partly revealed. Influence of the parameters, especially of the laser energy, on the depth profile and the crater size was observed and evaluated.

Broadband spectra were first acquired using Sci-Trace instrument (AtomTrace, Czech Republic) equipped with echelle spectrometer Emu-65 (Catalina Scientific, USA) and EMCCD camera (Falcon Blue, Raptor Photonics, IE). Significant element lines were chosen and samples were then re-measured using modified ablation system New Wave UP-266 MACRO equipped with Czerny Turner monochromator (TRIAX 320, Jobin Yvon, France) and an ICCD detector (PI max 3, Princeton Inst., USA). Obtained spectra were processed to create the depth profiles of the samples.

References:

¹ Analysis of fresco by laser induced breakdown spectroscopy: Caneve, L., et al. *Spectrochimica Acta Part B: Atomic Spectroscopy* 65.8 (2010): 702-706.