

Laser-Induced Breakdown Spectroscopy in the study of degraded glass mosaics

Eva Pospíšilová¹, David Hradil^{2,3}, Dana Rohanová⁴, Karel Novotný^{1,5}, Janka Hradilová³

¹*Department of Chemistry, Faculty of Science, Masaryk University, Kotlářská 2, Brno, CZ-61137, Czech Republic*

²*Institute of Inorganic Chemistry of the AS CR, v.v.i., ALMA laboratory, Husinec-Řež, CZ-25068 Czech Republic*

³*Academy of Fine Arts in Prague, ALMA laboratory, U Akademie 4, Prague 7, CZ-17022, Czech Republic*

⁴*Department of Glass and Ceramics, Faculty of Chemical Technology, Institute of Chemical Technology, Prague (ICT Prague), Technická 5, 166 28 Praha 6, Czech Republic*

⁵*Masaryk University, Central European Institute of Technology (CEITEC MU), Kamenice 753/5, Brno, CZ-62500, Czech Republic*

Key words: LIBS, depth profiling, glass, mosaics

Laser-Induced Breakdown Spectroscopy (LIBS) is a technique providing information on elemental composition of the sample using layer-by-layer ablation and subsequent analysis. Samples of degraded glass mosaics collected during reconstruction of a figure of Madonna from Malbork Castle, Poland were analysed using two different LIBS devices. Thirty laser shots were applied to one point and individual spectra were obtained for each shot. Significant elemental lines from spectra acquired by both instruments were chosen and processed to create the depth profiles of the samples. Calibration of the depth profile was performed applying 5, 10, 15, 20, 25 and 30 shots and measuring the depth of the craters using a 3D optical microscope, which uses interference with controlled change of phase to examine the topography of the sample. Determining the behaviour of significant elements in the depth profile together with the calibration allowed examination of the thickness of the corrosion layer.