



Society of Physical Chemists of Serbia

PHYSICAL CHEMISTRY 2021

*15th International Conference on
Fundamental and Applied Aspects of
Physical Chemistry*

PC2021

The Conference is dedicated to the

30th Anniversary of the founding of the Society of Physical Chemists of Serbia

and

100th Anniversary of Bray-Liebhaafsky reaction



PHYSICAL CHEMISTRY 2021

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B-07-P**LASER-INDUCED BREAKDOWN SPECTROSCOPY STUDY OF ARCHEOLOGICAL GLASS SAMPLES**

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Two unclassified glass samples of medieval origin found in Belgrade were examined by the laser-induced plasma spectroscopy (LIBS) technique. Measurements were performed with a LIBS system based on a compact TEA CO₂ laser with low pulse energy ($E < 170$ mJ). The threshold energy required to induce plasma on a glass sample was 80 mJ per pulse. Depending on the sample, spectral lines of Si, Al, Ca, Fe, Ti, Mg, Mn, Sr, Cu, K, Ba, Na, and Ni were detected. Detection limits (LODs) were also estimated for several elements: Ni (18 ppm), Cu (2.5 ppm), Ti (25 ppm), Mn (32 ppm), and K (205 ppm). The plasma diagnostics was performed to determine plasma temperature and electron concentration. The excitation temperature of 8700 K was evaluated using a Boltzmann plot, constructed from the measured relative integral intensities of iron spectral lines. The electron number density, determined using the intensity ratio of Ti ionic and atomic lines, was $2 \cdot 10^{17}$ cm⁻³.

B-08-P**OPTICAL SPECTROSCOPY OF PLASMA INDUCED BY IRRADIATION OF ANIMAL BONE WITH TEA CO₂ LASER**

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The application of laser-induced breakdown spectroscopy (LIBS) for the elemental analysis of pig shoulder bone samples is reported. Measurements were performed using a compact laboratory-made TEA CO₂ laser with low pulse energy. The recorded spectra consisted of well-defined lines of atoms and single charged ions of Ca, Mg, P, and other constituent elements, with a good signal-to-noise ratio suitable for spectrochemical analysis. Based on the ICP quantitative analysis of the bone sample, the limits of detection of LIBS analysis were estimated for Mg (16 ppm) and Na (940 ppm). Plasma parameters, temperature, and electron number density were determined by measuring Stark widths and relative intensities of the C and Mg ionic and atomic spectral lines.