

Stratigraphy by multiple wavelength laser-induced breakdown spectroscopy

Wolfgang Kautek^{1*}, Tristan O. Nagy¹, Ulrich Pacher¹, Monica Dinu², Roxana Radvan²

¹*Department of Physical Chemistry, University of Vienna, Währinger Strasse 42, A-1090 Vienna, Austria*

²*National Institute of Research and Development for Optoelectronics – INOE, 1 Atomistilor Street, P.O. Box MG-5, RO-76900, Bucharest- Magurele, Romania*

*wolfgang.kautek@univie.ac.at

Many modern industrial, medical, and conservation scientific applications require rapid qualitative and quantitative stratigraphic analyses of metal coatings. One promising option to achieve this is Laser-Induced Breakdown Spectroscopy (LIBS). However, a quantitative stratigraphy with a resolution down to the optical refraction limit has not been demonstrated yet.

This study used Nd:YAG lasers emitting at 1064, 532, 355 and 266 nm for the systematic ablation analysis of a Ni-Co alloy layer. The resulting plasma emission data were converted into stratigrams [1] employing the linear correlation coefficient method [2]. These were then used to determine the effective absorption coefficients [3], which were compared to theoretical estimations [4]. This approach allowed a systematic insight into both the influence of heat diffusion in the sample and laser-plasma interactions on the ablation rate.

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