

# Abstract

The aim of this thesis was the development and application of the calibration-free method of the laser induced breakdown spectroscopy (LIBS). The CF-LIBS method is used to quickly analyze of sample of any size and shapes without any required surface treatment, to determinate their elemental composition. In addition, the CF algorithm is also usefull for study of atomic plasma and hot gas emission spectra to determinate their elemental composition. From this point of view, very interesting is ablation analysis of complicated matrices such as meteorites and possible comparsion with spectral analysis of meteors.

In the frame of the presented bachelor thesis, was measured the ablation spectra of meteorite samples Porangaba (L4), Chellyabinsk (LL5), Northwest Africa 869 (L3-6) and Dhofar 1994 (CM2). Based on the measured spectra of these meteorites, was created an atlas of the emission lines and assigned parameters of the spectroscopic transitions of the elements, typically occuring in a meteorites. Thisatlas will also serve as the source database for automatic program *Ablator* (automatically evalueting of ablation emission spcectra) and *MeteorMaster* (automatic program for the interpretation of meteors spectra). The database will be used for CF-LIBS analysis of the Porangaba meteorite. The database is necesry, in particular in terms of the well known influence of sample matrix to ablation spectra. For a certain amount of analytes, it is necessary to create a knowlage base starting with selecting in the appropriate spectral lines typical of the sample and showing minimal affects of the matrix (in other words, the intesity of spectral lines must be influenced only with its own physical parameters and the element concentracion in the sample). S the reference method to CF-LIBS analysis of the Porangaba meteorites will be used EDS/WDS element microprobe. The resultes of CF-LIBS analysisi will be discussed as a method of providing quick, easy and inexpensive esample elemental analysis.

Key words:

meteorites, meteors, Chemical composition of the interplanetary mass, LIBS, CF-LIBS, calibration-free analysis, atomic spectroscopy.