Chemometrics and Numerical Methods in LIBS

Vincenzo Palleschi (Editor)

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📖 DESCRIPTION

Chemometrics and Numerical Methods in LIBS

A practical guide to the application of chemometric methods to solve qualitative and quantitative problems in LIBS analyses

Chemometrics and Numerical Methods in LIBS, delivers an authoritative and practical exploration of the use of advanced chemometric methods to laser-induced breakdown spectroscopy (LIBS) cases. The book discusses the fundamentals of chemometrics before moving on to solutions that can be applied to data analysis methods. It is a concise guide designed to help readers at all levels of knowledge solve commonly encountered problems in the field.

The book includes three sections: LIBS information simplification, LIBS classification, and quantitative analysis by LIBS. Each section of the book is divided into a description of relevant techniques and practical examples of its applications. Contributors to this edited volume are the most recognized international experts on the chemometric techniques relevant to LIBS analysis.

Chemometrics and Numerical Methods in LIBS also includes:

• A thorough introduction to the simplification of LIBS information, including principal component analysis, independent component analysis, and parallel factor analysis

• Comprehensive explorations of classification by LIBS, including spectral angle mapping, linear discriminant analysis, graph clustering, self-organizing maps, and artifical neural networks

• Practical discussions of linear methods for quantitative analysis by LIBS, including calibration curves, partial least squares regression, and limit of detection

• In-depth examinations of multivariate analysis and non-linear methods, including calibration-free LIBS, the non-linear Kalman filter, artificial and convolutional neural networks for quantification

Relevant for researchers and PhD students seeking practical information on the application of advanced statistical methods to the analysis of LIBS spectra, *Chemometrics and Numerical Methods in LIBS* will also earn a place in the libraries of students taking courses involving LIBS spectro-analytical techniques

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ABOUT THE AUTHOR

Vincenzo Palleschi is a Senior Researcher with the Institute of Chemistry of Organometallic Compounds, Italian Research Council and Professor of Advanced Analytical Chemistry at the University of Pisa. He is Associate Editor of the *Journal of Advanced Research* and a member of the Editorial Advisory Boards of *Spectrochimica Acta B* and *Reviews in Analytical Chemistry.* He has published more than 140 scientific papers on LIBS, making him the most productive author in LIBS ever. His paper on Calibration-Free LIBS, published in 1999, is the most quoted research paper in LIBS. In 2000 he was the organizer and chairperson of the First International Conference on LIBS in Pisa (Italy).

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