

Spectroscopy in Process Analysis

Spectroscopy in Process Analysis

Edited by

JOHN M. CHALMERS
ICI Technology
Wilton Research Centre
Cleveland
UK



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Spectroscopy in Process Analysis

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Edited by J.M. Chalmers

Preface

The planning of a reference volume in an area as important as spectroscopy in process analysis requires certain structural decisions. One obvious option is to organise the coverage by specific industries, such as food, pharmaceuticals, chemicals, etc. This approach was rejected, as it was thought likely to invite repetition of the more commonly used spectroscopic techniques, sampling procedures and chemometric methods. A technique-based work, in which each of the major spectroscopic disciplines employed in process analysis is considered by an experienced practitioner in the field, was thought likely to provide a more balanced and informative volume. There are many similarities in the challenges and problems of sampling, whether one is analysing milk or a polymer dispersion, interrogating a detergent or a formulated drug powder, or monitoring a web, fibre or film line.

This volume includes specialist chapters on multivariate analysis (chemometrics) and sampling and integration, both likely to be key elements in cost-effective and robust on-line process analysis. Many hopes have floundered because of failure to appreciate the initial messages of the statistics associated with regression analysis. On the other hand, precise, well-worked methods developed by a spectroscopist from the perspective of a research laboratory may be laughed out of the process plant as totally inappropriate to that environment and skill-base.

At a time when cost- and time-effective process spectroscopy is becoming an issue of increasing importance within the chemical industry, this volume should provide a valuable source of up-to-date information on technological advances in the area. It complements more general works on process analytical chemistry.

John M. Chalmers

Contributors

Mr Toru Amari	Mitsubishi Chemical Corporation, Yokkaichi Plant, 1. Toho-cho Yokkaichi, Mie 510-8530, Japan
Professor Bruce J. Balcom	Department of Physics, University of New Brunswick, PO Box 4400, Fredericton, New Brunswick, E3B 5A3, Canada
Professor Bernhard Blümich	Insitut für Technische und Makromolekulare Chemie, RWTH Aachen, Worringerweg 1, D-52056 Aachen, Germany
Mr John M. Chalmers	ICI Technology, Wilton Research Centre, PO Box 90, Wilton, Middlesbrough, Cleveland TS90 8JE, UK
Dr Todd Colin	The Eastman Kodak Company, Building 337, 1st Floor, Mail code 23619, Rochester, New York 14652-3619, USA
Dr Henryk Herman	Actinic Technology Ltd, 83 Crockford Park Road, Addlestone, Surrey KT15 2LN, UK
Dr M. Anne Leugers	Analytical Sciences, 1897 Building, The Dow Chemical Company, Midland, MI 48667, USA
Dr Elmer Lipp	Dow Corning Corp., Analytical Sciences Dept., C041C1, Midland, MI 48686-0994, USA
Dr Julián Maestro	Alstom Contracting S.A., Parque Empresarial San Fernando, Edificio Japón, 2a planta, 28831 San Fernando de Henares, Madrid, Spain
Professor John Marshall	ICI Technology, Wilton Research Centre, PO Box 90, Wilton, Middlesbrough, Cleveland TS90 8JE, UK

Professor Yukihiro Ozaki	Department of Chemistry, School of Science, Kwansei-Gakuin University, Uegahara, Nishi- nomiya 662-8501, Japan
Dr Pablo Jose Prado	Quantum Magnetics Inc., 7740 Kenamar Court, San Diego, CA 92121-2425, USA
Dr D. Warren Vidrine	Vidrine Consulting, 26545 Camino de Vista N., San Juan Capistrano, CA 92675, USA
Dr Anthony D. Walmsley	Department of Chemistry, University of Hull, Hull HU6 7RX, UK

1 Introduction

John M. Chalmers

1.1 Overview

In a volume discussing essentially the *status quo* for the more commonly used spectroscopic techniques in process analysis, it is interesting first to reflect on how things have progressed over the recent past. In doing so, one realises how rapidly today's technology has enabled adaptation of many of yesterday's research measurement science techniques into robust, versatile systems suitable as process analysers and monitors.

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 - Near-infrared reflectance.

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'Spectroscopy has probably seen as much change as any other analytical technique in recent years. It is a wide and varied subject, each individual technique almost a specialist technology in its own right. During the past decade, we have also seen major developments in on-line spectrometric analyzers; techniques such as mass spectrometry and X-ray fluorescence, hitherto restricted to the laboratory, have now migrated into the on-line process field. Such development is still proceeding today and will almost certainly continue in the future.'

How true was this prediction! The use of spectroscopy for industrial process on-line analysis has and continues to grow steadily, both from

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