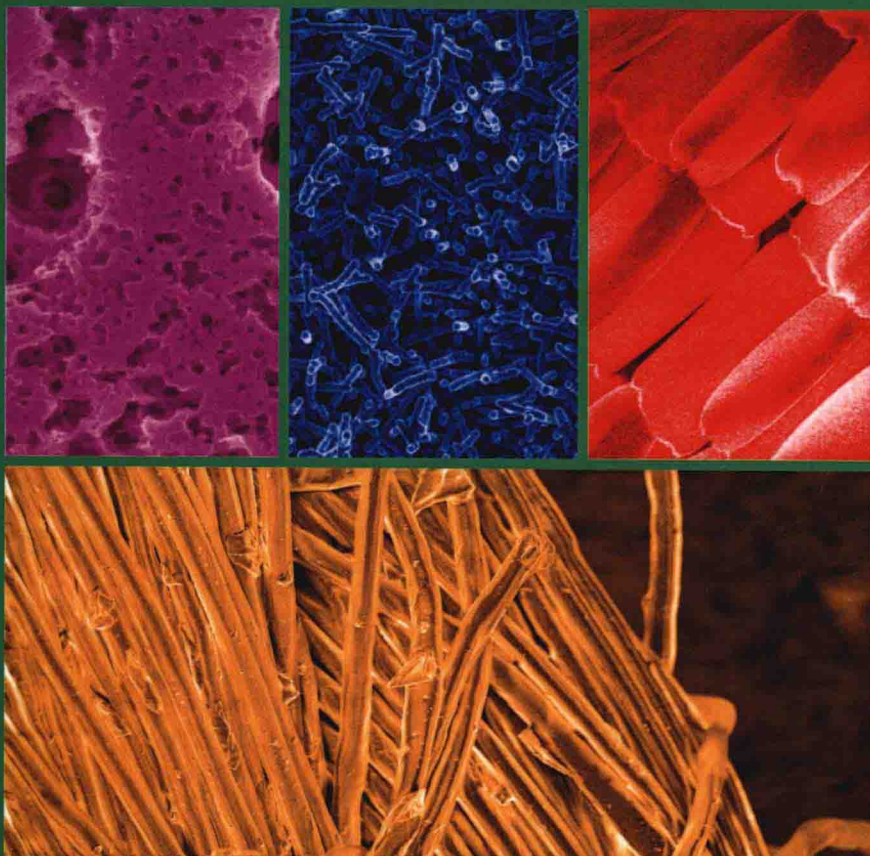


Volume 1

The Chemistry and Physics of Engineering Materials

Modern Analytical Methodologies



Editors

Alexandr A. Berlin, DSc Roman Joswik, PhD Nikolai I. Vatin, DSc

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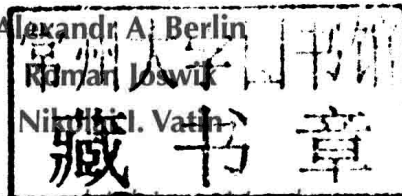
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Volume 1: Modern Analytical Methodologies

Edited by

Alexandr A. Berlin
Roman Loswik
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LIST OF ABBREVIATIONS

AAS	atomic absorption spectroscopy
AFM	atomic force microscope
AMPA	2,2'-azobis(2-methylpropionamide) dihydrochloride
AMS	antibiotic amikacin sulfate
APP	ammonium polyphosphate
APTES	(3-aminopropyl)triethoxysilane
ATH	alumina trihydrate
ATR FTIR	attenuated total reflectance Fourier transform infrared spectroscopy
BPEI	branched polyethylenimine
CA	carbonization agent
CB	carbon black
CCPGQY	charge carrier photogeneration quantum yield
CFT	cefotaxime
CHT	chitosan
CNR	chlorinated natural rubber
CNT	carbon nanotubes
CP	citrus pectin
CTC	charge-transfer complex
DLS	dynamic light scattering
DMEM	Dulbecco's Modified Eagle's Medium
DSC	differential scanning calorimetry
DTG	differential thermogravimetry
DVM	digital voltmeter
EDA	electron donor-acceptor
EMR	electron magnetic resonance
EPDM	ethylene-propylene-diene terpolymer
EVA	ethylene-vinyl-acetate copolymer
FR	fire retardant
GLC	gas-liquid chromatography
HDPE	high density polyethylene
HFI	hyperfine interaction
HIPS	high impact polystyrene

HRC	heat release capacity
IFR	intumescent fire retardant
LBL	layer by layer technique
LDH	layered double hydroxide
LDPE	low density polyethylene
LOI	limiting oxygen index
MCC	microscale combustion calorimeter
MCPBA	meta-chloroperbenzoic
MH	magnesium hydroxide
MMT	montmorillonite
MNP	magnetic nanoparticles
MR	magnetic resonance
MRI	magnetic resonance imaging
PA6	polyamide 6
PAEI	polyalkanetherimide
PDID	perylene diimide derivative
PDMAAm	poly(N, N)-dimethylacrylamide
PE	polyethylenes
PEG	poly(ethylene glycol)
PER	pentaerythritol
PES	photoelectric sensitivity
PHRR	peak heat release rate
PMMA	poly(methyl methacrylate)
PP	polypropylene
PV	photovoltaic
PVA	polyvinyl alcohol
SAN	poly(acrylonitrile-costyrene)
SAXS	small-angle X-ray scattering
SEM	scanning electron microscope
TEM	transmission electron microscopy
TEOS	tetraethylorthosilicate
TG	thermogravimetry
THR	total heat release
TMOS	tetramethylorthosilicate
TTI	time to ignition
XRD	x-ray diffraction
ZP	zeta potential
ZrP	α -zirconium phosphate

PREFACE

The collection of topics in the two-volume publication is to reflect the diversity of recent advances in this field with a broad perspective which may be useful for scientists as well as for graduate students and engineers. This new book presents leading-edge research from around the world in this dynamic field.

Diverse topics published in this book are the original works of some of the brightest and most well-known international scientists in two separate volumes.

In the first volume, modern analytical methodologies are presented here.

The first volume offers scope for academics, researchers, and engineering professionals to present their research and development works that have potential for applications in several disciplines of engineering and science. Contributions range from new methods to novel applications of existing methods to provide an understanding of the material and/or structural behavior of new and advanced systems.

In the second volume, limitations, properties and models are presented. These two volumes:

- are collections of articles that highlight some important areas of current interest in recent advances in chemistry and physics of engineering materials
- give an up-to-date and thorough exposition of the present state-of-the-art of chemical physics
- describe the types of techniques now available to the chemist and technician, and discuss their capabilities, limitations and applications.
- provide a balance between chemical and material engineering, basic and applied research.

We would like to express our deep appreciation to all the authors for their outstanding contributions to this book and to express our sincere gratitude for their generosity. All the authors eagerly shared their experiences and expertise in this new book. Special thanks go to the referees for their valuable work.

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