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特种结构

【第6册】

Springer Handbook of

Condensed Matter and Materials Data

W.Martienssen

H.Warlimont

Editors

哈爾濱工業大學出版社
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Springer Handbook of Condensed Matter and Materials Data

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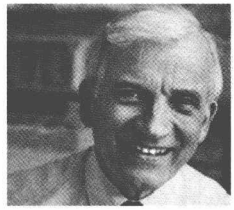
The volumes will be designed to be useful as readable desk reference book to give a fast and comprehensive overview and easy retrieval of essential reliable key information, including tables, graphs, and bibliographies. References to extensive sources are provided.

Preface

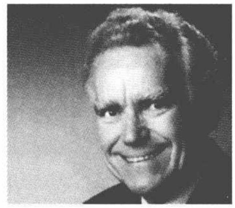
The Springer Handbook of Condensed Matter and Materials Data is the realization of a new concept in reference literature, which combines introductory and explanatory texts with a compilation of selected data and functional relationships from the fields of solid-state physics and materials in a single volume. The data have been extracted from various specialized and more comprehensive data sources, in particular the Landolt–Börnstein data collection, as well as more recent publications. This Handbook is designed to be used as a desktop reference book for fast and easy finding of essential information and reliable key data. References to more extensive data sources are provided in each section. The main users of this new Handbook are envisaged to be students, scientists, engineers, and other knowledge-seeking persons interested and engaged in the fields of solid-state sciences and materials technologies.

The editors have striven to find authors for the individual sections who were experienced in the full breadth of their subject field and ready to provide succinct accounts in the form of both descriptive text and representative data. It goes without saying that the sections represent the individual approaches of the authors to their subject and their understanding of this task. Accordingly, the sections vary somewhat in character. While some editorial influence was exercised, the flexibility that we have shown is deliberate. The editors are grateful to all of the authors for their readiness to provide a contribution, and to cooperate in delivering their manuscripts and by accepting essentially all alterations which the editors requested to achieve a reasonably coherent presentation.

An onerous task such as this could not have been completed without encouragement and support from the publisher. Springer has entrusted us with this novel project, and Dr. Hubertus von Riedesel has been a persistent but patient reminder and promoter of our work throughout. Dr. Rainer Poerschke has accompanied and helped the editors constantly with his professional attitude and very personable style during the process of developing the concept, soliciting authors, and dealing with technical matters. In the later stages, Dr. Werner Skolaut became a relentless and hard-working member of our team with his painstaking contribution to technically editing the authors' manuscripts and linking the editors' work with the copy editing and production of the book.



Prof. Werner Martienssen



Prof. Hans Warlimont

We should also like to thank our families for having graciously tolerated the many hours we have spent in working on this publication.

We hope that the users of this Handbook, whose needs we have tried to anticipate, will find it helpful and informative. In view of the novelty of the approach and any possible inadvertent deficiencies which this first edition may contain, we shall be grateful for any criticisms and suggestions which could help to improve subsequent editions so that they will serve the expectations of the users even better and more completely.

September 2004
Frankfurt am Main, Dresden

Werner Martienssen,
Hans Warlimont

About the Authors

Wolf Assmus

Johann Wolfgang Goethe-University
Physics Department
Frankfurt am Main, Germany
assmus@physik.uni-frankfurt.de
http://www.rz.uni-frankfurt.de/piweb/kmlab/Leiter.html

Chapter 1.3

Dr. Wolf Assmus (Kucera Professor) is Professor of Physics at the University of Frankfurt and Dean of the Physics-Faculty. He is a solid state physicist, especially interested in materials research and crystal growth. His main research fields are: materials with high electronic correlation, quasicrystals, materials with extremely high melting temperatures, magnetism, and superconductivity.

Stefan Brühne

Johann Wolfgang Goethe-University
Physics Department
Frankfurt am Main, Germany
bruehne@physik.uni-frankfurt.de

Chapter 1.3

Dr. Stefan Brühne, née Mahne, a chemist by education in Germany and England, received his PhD in 1994 from Dortmund University, Germany, on giant cell crystal structures in the Al–Ta system. Following a post doc position at the Materials Department (Crystallography) at ETH Zurich he spent seven years in the ceramics industry. His main activity was R&D of glasses, frits and pigments for high-temperature applications, thereby establishing design of experiment (DoE) techniques. Since 2002, at the Institute of Physics at Frankfurt University he has been investigated X-ray structure determination of quasicrystalline, highly complex and disordered intermetallic materials.

Fabrice Charra

Commissariat à l'Énergie Atomique, Saclay
Département de Recherche sur l'État Condensé, les Atomes et les Molécules
Gif-sur-Yvette, France
fabrice.charra@cea.fr
http://www-drecam.cea.fr/spcsi/

Chapter 5.3

Fabrice Charra conducts researche in the emerging field of nanophotonics, in the surface physics laboratory of CEA/Saclay. The emphasis of his work is on light emission and absorption form single nanoscale molecular systems. His area of expertise also extends to nonlinear optics, a domain to which he contributed several advances in the applications of organic materials.

Gianfranco Chiarotti

University of Rome "Tor Vergata"
Department of Physics
Roma, Italy
chiarotti@roma2.infn.it

Chapter 5.2

Gianfranco Chiarotti is Professor Emeritus, formerly Professor of General Physics, Fellow of the American Physical Society, fellow of the Italian National Academy (Accademia Nazionale dei Lincei). He was Chairman of the Physics Committee of the National Research Council (1988–1994), Chair Franqui at the University of Liège (1975), Assistant Professor at the University of Illinois (1955–1957), Editor of the journal Physics of Solid Surfaces, and Landolt–Börnstein Editor of Springer-Verlag from 1993 through 1996. He has worked in several fields of solid state physics, namely electronic properties of defects, modulation spectroscopy, optical properties of semiconductors, surface physics, and scanning tunnelling microscopy (STM) in organic materials.

Claus Fischer

Formerly Institute of Solid State and Materials Research (IFW)
Dresden, Germany
A_C.FischerDD@t-online.de

Chapter 4.2

Claus Fischer recieved his PhD from the Technical University Dresden (Since his retirement in 2000 he continues to work as a foreign scientist of IFW in the field of high-T_c superconductors.) His last position at IFW was head of the Department of Superconducting Materials. The main areas of research were growth of metallic single crystals in particular of magnetic materials, developments of hard magnetic materials, of materials for thick film components of microelectronics and of low-T_c and high-T_c superconducting wires and tapes. Many activities were performed in cooperation with industrial manufacturers.

Günter Fuchs

Leibniz Institute for Solid State and Materials Research (IFW) Dresden
Magnetism and Superconductivity in the Institute of Metallic Materials
Dresden, Germany
fuchs@ifw-dresden.de
http://www.ifw-dresden.de/imw/21/

Chapter 4.2

Dr. Günter Fuchs studied physics at the Technical University of Dresden, Germany, and received his PhD in 1980 on the pinning mechanism in superconducting NbTi alloys. Since 1969 he has been at the Institute of Solid State and Materials Research (IFW) in Dresden. His activities are in superconductivity (HTSC, MgB_2, intermetallic borocarbides) and the applications of superconductors. He received the PASREG Award for outstanding scientific achievements in the field of bulk cuprate superconductors in high magnetic fields in 2003.

Frank Goodwin

International Lead Zinc Research Organization, Inc.
Research Triangle Parc, NC, USA
fgoodwin@ilzro.org
http://www.ilzro.org/Contactus.htm

Chapter 3.1

Frank Goodwin received his Sc.D. from the Massachusetts Institute of Technology in 1979 and is responsible for all materials science research at International Lead Zinc Research Organization, Inc. where he has conceived and managed numerous projects on lead and zinc-containing products. These have included lead in acoustics, cable sheathing, nuclear waste management and specialty applications, together with zinc in coatings, castings and wrought forms.

Susana Gota-Goldmann

Commissariat à l'Energie Atomique (CEA)
Direction de la Recherche Technologique (DRT)
Fontenay aux Roses, France
susana.gota-goldmann@cea.fr

Chapter 5.3

Dr. Susana Gota-Goldmann received her PhD in Materials Science form the Université Pierre et Marie Curie (Paris V) in 1993. After her PhD, she was engaged as a researcher in the Materials Science Division of the CEA (Commissariat à l'Energie Atomique, France). She has focused her scientific activity on the growth and characterisation of nanometric oxide layers with applications in spin electronics and photovoltaics. In parallel she has developed the use of synchrotron radiation techniques (X-ray absorption magnetic dicroism, photoemission, resonant reflectivity) for the study of oxide thin layers. Recently she has moved from fundamental to technological research. Dr. Gota-Goldmann is now working as a project manager at the scientific affairs direction of the Technology Research Division (CEA/DRT).

Sivaraman Guruswamy

University of Utah
Metallurgical Engineering
Salt Lake City, UT, USA
sguruswa@mines.utah.edu
http://www.mines.utah.edu/metallurgy/MML

Chapter 3.1

Dr. Guruswamy is a Professor of Metallurgical Engineering at the University of Utah. He obtained his Ph.D. degree in Metallurgical Engineering from the Ohio State University in 1984. He has made significant contributions in several areas including magnetic materials development, deformation of compound semiconductors, and lead alloys. His current work focuses on magnetostrictive materials and hybrid thermionic/thermoelectric thermal diodes.

Gagik G. Gurzadyan

Technical University of Munich
Institute for Physical and Theoretical Chemistry
Garching, Germany
gurzadyan@ch.tum.de
http://zentrum.phys.chemie.tu-muenchen.de/gagik

Chapter 4.4

Gagik G. Gurzadyan, Ph.D., Dr. Sci., has extensive experience in nonlinear optics and crystals, laser photophysics and spectroscopy. He has authored several books including the Handbook of Nonlinear Optical Crystals published by Springer-Verlag. He worked in the Institute of Spectroscopy (USSR), CEA/Saclay (France), Max-Planck-Institute of Radiation Chemistry (Germany). At present he works at the Technical University of Munich with ultrafast lasers in the fields of nonlinear photochemistry of biomolecules and femtosecond spectroscopy.

Hideki Harada

High Tech Association Ltd.
Higashikaya, Fukaya,Saitama, Japan
khb16457@nifty.com
http://homepage1.nifty.com/JABM

Chapter 4.3

Dr. Hideki Harada is chief advisor of magnetic materials and their application and President of High Tech Association Ltd., Saitama, Japan. He is Chairman of the Japan Association of Bonded Magnet Industries (JABM) and received his Ph.D. in 1987 with a work on electrostatic ferrite materials. He worked in research and development of magnetic materials and cemented carbide tools at Hitachi Metals where he also was on the Board of Directors. He received the Japanese National Award for Industries Development Contribution.

Bernhard Holzapfel

Leibniz Institute for Solid State and Materials Research Dresden – Institute of Metallic Materials
Superconducting Materials
Dresden, Germany
B.Holzapfel@ifw-dresden.de
http://www.ifw-dresden.de/imw/26/

Chapter 4.2

Dr. Bernhard Holzapfel is head of the superconducting materials group at the Leibniz Institute for Solid State and Materials Research (IFW) Dresden, Germany. His main area of research is pulsed laser deposition of functional thin films and superconductivity. Currently he works on the development of HTSC high J_c coated conductors using ion beam assisted deposition or highly textured metal substrates. His work is supported by a number of national and European founded research projects.

Karl U. Kainer

GKSS Research Center Geesthacht
Institute for Materials Research
Geesthacht, Germany
karl.kainer@gkss.de
http://www.gkss.de

Chapter 3.1

Professor Kainer is director of Institute for Materials Research at GKSS-Research Center, Geesthacht and Professor of Materials Technology at the Technical University of Hamburg-Harburg. He obtained his Ph.D. in Materials Science at the Technical University of Clausthal in 1985 and his Habilitation in 1996. In 1988 he received the Japanese Government Research Award for Foreign Specialists. His current research activities are the development of new alloys and processes for magnesium materials.

Catrin Kammer

METALL – Intl. Journal for Metallurgy
Goslar, Germany
Kammer@metall-news.com
http://www.giesel-verlag.de

Chapter 3.1

Catrin Kammer received her Ph.D. in materials sciences from the Technical University Bergakademie Freiberg, Germany, in 1989. She has been working in the field of light metals and is author of several handbooks about aluminium and magnesium. She is working as author for the journal ALUMINIUM and is teaching in material sciences. Since 2001 she is editor-in-chief of the journal METALL, which deals with all non-ferrous metals.

Wolfram Knabl

Plansee AG
Technology Center
Reutte, Austria
wolfram.knabl@plansee.com
http://www.plansee.com

Chapter 3.1

Dr. Wolfram Knabl studied materials science at the Mining University of Leoben, Austria and received his Ph.D. at the Plansee AG focusing on the development of oxidation protective coatings for refractory metals. Between 1996 and 2002 he was responsible for the test laboratories at Plansee AG and since October 2002 he is working in the field of refractory metals, especially material and process development in the technology center of Plansee AG.

Alfred Koethe

Leibniz-Institut für Festkörper- und Werkstoffforschung
Institut für Metallische Werkstoffe (retired)
Dresden, Germany
alfred.koethe@web.de

Chapter 3.1

Dr. Alfred Koethe is physicist and professor of Materials Science. He retired in 2000 from his position as head of department in the Institute of Metallic Materials at the Leibniz Institute of Solid State and Materials Research in Dresden, Germany. His main research activities were in the fields of preparation and properties of ultrahigh-purity refractory metals and, especially, of steels (stainless steels, high strenght steels, thermomechanical treatment, microalloying, relations chemical composition/microstructure/properties).

Dieter Krause

Schott AG
Research and Technology-Development
Mainz, Germany
dieter.krause@schott.com

Chapter 3.4

Dieter Krause studied physics at the universities of Erlangen and Munich, Germany, where he received his Ph.D. for work on magnetism and metal physics. He was professor in Tehran, Iran, lecturer in Munich and Mainz, Germany. As scientist and director of Schott's corporate research and development centre he was involved in research on optical and mechanical properties of amorphous materials, thin films, and optical fibres. Now he is consultant, chief scientist, and the editor of the "Schott Series on Glass and Glass Ceramics – Science, Technology, and Applications" published by Springer.

Manfred D. Lechner

Universität Osnabrück
Institut für Chemie – Physikalische Chemie
Osnabrück, Germany
lechner@uni-osnabrueck.de
http://www.chemie.uni-osnabrueck.de/pc/index.html

Chapter 3.3

Professor Lechner has a PhD in chemistry from the University of Mainz, Germany. Since 1975 he is Professor of Physical Chemistry at the Institute of Chemistry of the University of Osnabrück, Germany. His scientific work concentrates on the physics and chemistry of polymers. In this area he is mainly working on the influence of high pressure on polymer systems, polymers for optical storage and waveguides as well as synthesis and properties of superabsorbers from renewable resources.

Gerhard Leichtfried

Plansee AG
Technology Center
Reutte, Austria
gerhard.leichtfried@plansee.com
http://www.plansee.com

Chapter 3.1

Dr. Gerhard Leichtfried received his Ph.D from the Montanuniversität Leoben and is qualified for lecturing in powder metallurgy. For 20 years he has been working in various senior positions for the Plansee Aktiengesellschaft, a company engaged in refractory metals, composite materials, cemented carbides and sintered iron and steels.

Werner Martienssen

Universität Frankfurt/Main
Physikalisches Institut
Frankfurt/Main, Germany
Martienssen@Physik.uni-frankfurt.de

Chapters 1.1, 1.2, 2.1, 4.1

Werner Martienssen studied physics and chemistry at the Universities of Würzburg and Göttingen, Germany. He obtained his Ph.D. in Physics with R.W. Pohl, Göttingen, and holds an honorary doctorate at the University of Dortmund. After a visiting-professorship at the Cornell University, Ithaca, USA in 1959 to 1960 he taught physics at the University of Stuttgart and since 1961 at the University of Frankfurt/Main. His main research fields are condensed matter physics, quantum optics and chaotic dynamics. Two of his former students and coworkers became Nobel-laureates in Physics, Gerd K. Binnig for the design of the scanning tunneling microscope in 1986 and Horst L. Störmer for the discovery of a new form of quantum-fluid with fractionally charged excitations in 1998. Werner Martienssen is a member of the Deutsche Akademie der Naturforscher Leopoldina, Halle and of the Akademie der Wissenschaften zu Göttingen. Since 1994 he is Editor-in-Chief of the data collection Landolt–Börnstein published by Springer, Heidelberg.

Toshio Mitsui

Osaka University
Takarazuka, Japan
t-mitsui@jttk.zaq.ne.jp

Chapter 4.5

Toshio Mitsui is an emeritus professor of Osaka University. He studied solid state physics and biophysics at Hokkaido University, Pennsylvania State University, Brookhaven National Laboratory, the Massachusetts Institute of Technology, Osaka University and Meiji University. He was the first to observe the ferroelectric domain structure in Rochelle salt with a polarization microscope. He proposed various theories on ferroelectric effects and biological molecular machines.

Manfred Müller

Dresden University of Technology
Institute of Materials Science
Dresden, Germany
m.mueller33@t-online.de

Chapter 4.3

Dr.-Ing. habil. Manfred Müller is a Professor emeritus of Special Materials at the Institute of Materials Science of the Dresden University of Technology. Before his retirement he was for many years head of department for special materials at the Central Institute for Solid State Physics and Materials Research of the Academy of Sciences in Dresden, Germany. His main field was the research and development of metallic materials with emphasis on special physical properties, such as soft and hard magnetic, electrical and thermoelastic properties. His last field of research was amorphous and nanocrystalline soft magnetic alloys. He is a member of the German Society of Materials Science (DGM) and was a member of the Advisary Board of DGM.

Sergei Pestov

Moscow State Academy of Fine Chemical Technology
Department of Inorganic Chemistry
Moscow, Russia
pestovsm@yandex.ru

Chapter 5.1

Dr. Pestov is a docent of the Inorganic Chemistry Department and a head of group on liquid crystals (LC) at the Moscow State Academy of Fine Chemical Technology. He earned his Ph.D. in physical chemistry in 1992. His research is focused on thermal analysis and thermodynamics of systems containing LC and physical properties of LC. He is an author of a Landolt–Börnstein volume and two books devoted to liquid crystals.

Günther Schlamp

Metallgesellschaft Ffm and Degussa Demetron (retired)
Steinbach/Ts, Germany

Chapter 3.1

Günther Schlamp received his Ph.D. from the Johann-Wolfgang-Goethe University of Frankfurt/Main, Germany, in Physical Chemistry. His industrial activities in research include the development and production of refractory material coatings, high purity materials and parts for electronics, and sputter targets for the reflection-enhancing coating of glas. He has contributed to several Handbooks with repoprts on properties and applications of noble metals and their alloys.

Barbara Schüpp-Niewa

Leibniz-Institute for Solid State and Materials Research Dresden
Institute for Metallic Materials
Dresden, Germany
b.schuepp@ifw-dresden.de
http://www.ifw-dresden.de

Chapter 4.2

Barbara Schüpp-Niewa studied chemistry in Gießen and Dortmund where she received her Ph.D. in 1999. Since 2000 she has been a scientist at the Leibniz-Institute for Solid State and Materials Research Dresden with a focus on crystal structure investigations of oxometalates with superconducting or exciting magnetic ground states. Her current research activities include coated conductors.

Roland Stickler

University of Vienna
Department of Chemistry
Vienna, Austria
roland.stickler@univie.ac.at

Chapter 3.1

Professor Stickler received his master and Dr. degree from the Technical University in Vienna. From 1958 to 1972 he was manager of physical metallurgy with the Westinghouse Research Laboratory in Pittsburgh, Pa. In 1972 he accepted a full professorship at the University of Vienna heading a materials science group in the Institute of Physical Chemistry, and from 1988 he was head of this institute until his retirement as professor emeritus in 1998. He was involved in research and engineering work on superalloys, semiconductor materials and high melting point materials, investigating the relationship between microstructure and mechanical behavior, in particular fatigue and fracture mechanics properties. He was leader of a successful project on brazing under microgravity conditions in the Spacelab-Mission. Further activities included the participation in European COST projects, in particular as chairman of actions on powder metallurgy and light metals. He has authored and coauthored more than 250 publications in scientific journals and proceedings.

Pancho Tzankov

Max Born Institute for Nonlinear Optics
and Short Pulse Spectroscopy
Berlin, Germany
tzankov@mbi-berlin.de
http://staff.mbi-berlin.de/tzankov/

Chapter 4.4

Pancho Tzankov studied laser physics at Sofia University, Bulgaria, and received his Ph.D. in physical chemistry from the Technical University of Munich, Germany. He is now a postdoctoral fellow at the Max Born Institute in Berlin, Germany. His research activities involve development of new nonlinear optical parametric sources of ultrashort pulses and their application for time-resolved spectroscopy.

Volkmar Vill

University of Hamburg
Department of Chemistry, Institute of
Organic Chemistry
Hamburg, Germany
vill@chemie.uni-hamburg.de
http://liqcryst.chemie.uni-hamburg.de/

Chapter 5.1

Professor Volkmar Vill received his Diploma in Chemistry in 1986, his Diploma in Physics in 1988 and his Ph.D. in Chemistry in 1990 from the University of Münster, Germany. In 1997 he earned his Habilitation in Organic Chemistry from the University of Hamburg where he is Professor of Organic Chemistry since 2002. He is the author of the LiqCryst – Database of Liquid Crystals and the Editor of the Handbook of Liquid Crystals, of Landolt–Börnstein, Organic Index, and Vol. VIII/5a, Physical Properties of Liquid Crystals.

Hans Warlimont

DSL Dresden Material-Innovation GmbH
Dresden, Germany
warlimont@ifw-dresden.de

Chapters 3.1, 3.2, 4.2, 4.3

Hans Warlimont is a physical metallurgist and has worked on numerous topics in several research institutions and industrial companies. Among them were the Max-Planck-Institute of Metals Research, Stuttgart, and Vacuumschmelze, Hanau. He was Scientific Director of the Leibniz-Institute of Solid State and Materials Research Dresden and Professor of Materials Science at Dresden University of Technology. Recently he has established DSL Dresden Material-Innovation GmbH to industrialise his invention of electroformed battery grids.

Acknowledgements

2.1 The Elements

by Werner Martienssen

We thank Dr. G. Leichtfried, Plansee AG, A-6600 Reutte/Tirol for recently determined new data on the refractory metals Nb, Ta, and Mo, W.

4.1 Semiconductors

by Werner Martienssen

In selecting the "most important information" from the huge data collection in Landolt–Börnstein, the author found great help in the new *Semiconductors: Data Handbook* [1]. Again, the data in this Springer Handbook of Condensed Matter and Materials Data represent only a small fraction of the information given in *Semiconductors: Data Handbook*, which is about 700 pages long. I am much indebted to my colleague O. Madelung for kindly presenting me the manuscript of that Handbook prior to publication.

[1] O. Madelung (Ed.): *Semiconductors: Data Handbook*, 3rd Edn. (Springer, Berlin, Heidelberg 2004)

4.5 Ferroelectrics and Antiferroelectrics

by Toshio Mitsui

The author of this subchapter thanks the coauthors of LB III/36 for their helpful discussions and suggestions. Especially, he is much indebted to Prof. K. Deguchi for his kind support throughout the preparation of the manuscript.

List of Abbreviations

2D-BZ	2-dimensional Brillouin zone
2P-PES	2-photon photoemission spectroscopy

A

AES	Auger electron spectroscopy
AFM	atomic force microscope
AISI	American Iron and Steel Institute
APS	appearance potential spectroscopy
ARUPS	angle-resolved ultraviolet photoemission spectroscopy
ARXPS	angle-resolved X-ray photoemission spectroscopy
ASTM	American Society for Testing and Materials
ATR	attenuated total reflection

B

BBZ	bulk Brillouin zone
BIPM	Bureau International des Poids et Mesures
BZ	Brillouin zone

C

CB	conduction band
CBM	conduction band minimum
CISS	collision ion scattering spectroscopy
CITS	current imaging tunneling spectroscopy
CMOS	complementary metal–oxide–semiconductor
CODATA	Committee on Data for Science and Technology
CVD	chemical vapour deposition

D

DFB	distributed-feedback
DFG	difference frequency generation
DOS	density of states
DSC	differential scanning calorimetry
DTA	differential thermal analysis

E

EB	electron-beam melting
ECS	electron capture spectroscopy
EELS	electron-energy loss spectroscopy
ELEED	elastic low-energy electron diffraction
ESD	electron-stimulated desorption
EXAFS	extended X-ray absorption fine structure

F

FEM	field emission microscope/microscopy
FIM	field ion microscope/microscopy

G

GMR	giant magnetoresistance

H

HAS	helium atom scattering
HATOF	helium atom time-of-flight spectroscopy
HB	Brinell hardness number
HEED	high-energy electron diffraction
HEIS	high-energy ion scattering/high-energy ion scattering spectroscopy
HK	Knoop hardness
HOPG	highly oriented pyrolytic graphite
HPDC	high-pressure die casting
HR-EELS	high-resolution electron energy loss spectroscopy
HR-LEED	high-resolution LEED
HR-RHEED	high-resolution RHEED
HREELS	high-resolution electron energy loss spectroscopy
HRTEM	high-resolution transition electron microscopy
HT	high temperature
HTSC	high-temperature superconductor
HV	Vicker's Hardness

I

IACS	International Annealed Copper Standard
IB	ion bombardment
IBAD	ion-beam-assisted deposition
ICISS	impact ion scattering spectroscopy
ICSU	International Council of the Scientific Unions
IPE	inverse photoemission
IPES	inverse photoemission spectroscopy
ISO	International Organization for Standardization
ISS	ion scattering spectroscopy
IUPAC	International Union of Pure and Applied Chemistry

J

JDOS	joint density of states

K

KRIPES K-resolved inverse photoelectron spectroscopy

L

LAPW linearized augmented-plane-wave method
LB Langmuir–Blodgett
LCM liquid crystal material
LCP liquid crystal polymer
LCs liquid crystals
LDA local-density approximation
LDOS local density of states
LEED low-energy electron diffraction
LEIS low-energy ion scattering/low-energy ion scattering spectroscopy
LPE liquid phase epitaxy

M

MBE molecular-beam epitaxy
MD molecular dynamics
MEED medium-energy electron diffraction
MEIS medium-energy ion scattering/medium-energy ion scattering spectroscopy
MFM magnetic force microscopy
ML monolayer
MOCVD metal-organic chemical vapor deposition
MOKE magneto-optical Kerr effect
MOSFET MOS field-effect transistor
MQW multiple quantum well

N

NICISS neutral impact collision ion scattering spectroscopy
NIMs National Institutes for Metrology

O

OPO optical parametric oscillation

P

PDS photothermal displacement spectroscopy
PED photoelectron diffraction
PES photoemission spectroscopy
PLAP pulsed laser atom probe
PLD pulsed laser deposition
PSZ stabilized zirconia
PZT piezoelectric material

R

RAS reflectance anisotropy spectroscopy
RE rare earth
REM reflection electron microscope/microscopy
RHEED reflection high-energy electron diffraction
RIE reactive ion etching
RPA random-phase approximation
RT room temperature
RTP room temperaure and standard pressure

S

SAM self-assembled monolayer
SAM scanning Auger microscope/microscopy
SARS scattering and recoiling ion spectroscopy
SAW surface acoustic wave
SBZ surface Brillouin zone
SCLS surface core level shift
SDR surface differential reflectivity
SEM scanning electron microscope
SEXAFS surface-sensitive EXAFS
SFG sum frequency generation
SH second harmonic
SHG second-harmonic generation
SI Système International d'Unités
SIMS secondary-ion mass spectroscopy
SNR signal-to-noise ratio
SPARPES spin polarized angle-resolved photoemission spectroscopy
SPIPES spin-polarized inverse photoemission spectroscopy
SPLEED spin-polarized
SPV surface photovoltage spectroscopy
SQUIDS superconducting quantum interference devices
SS surface state
STM scanning tunneling microscope/microscopy
STS scanning tunneling spectroscopy
SXRD surface X-ray diffraction

T

TAFF thermally activated flux flow
TEM transmission electron microscope/microscopy
TFT thin-film transistor
TMR tunnel magnetoresistance
TMT thermomechanical treatment
TOF time of flight
TOM torsion oscillation magnetometry

TRS truncation rod scattering
TTT time-temperature-transformation

U

UHV ultra-high vacuum
UPS ultraviolet photoemission spectroscopy
UV ultraviolet

V

VBM valence band maximum
VLEED very low-energy electron diffraction

X

XPS X-ray photoemission spectroscopy