



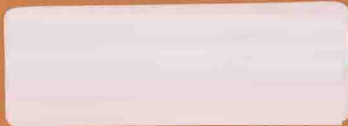
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凝聚态物质与材料数据手册

通用表和元素

【第1册】

Springer
Handbook^{of}
Condensed Matter
and Materials Data

artienssen

H. Warlimont

Editors



哈尔滨工业大学出版社
HARBIN INSTITUTE OF TECHNOLOGY PRESS



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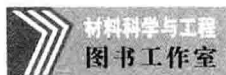
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Springer Handbook

of Condensed Matter and Materials Data

W. Martienssen and H. Warlimont (Eds.)

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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.

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



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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 *Semicon-*

ductors: 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		R	
KRIPEs	K-resolved inverse photoelectron spectroscopy	RAS	reflectance anisotropy spectroscopy
L		RE	rare earth
LAPW	linearized augmented-plane-wave method	REM	reflection electron microscope/microscopy
LB	Langmuir–Blodgett	RHEED	reflection high-energy electron diffraction
LCM	liquid crystal material	RIE	reactive ion etching
LCP	liquid crystal polymer	RPA	random-phase approximation
LCs	liquid crystals	RT	room temperature
LDA	local-density approximation	RTP	room temperature and standard pressure
LDOS	local density of states	S	
LEED	low-energy electron diffraction	SAM	self-assembled monolayer
LEIS	low-energy ion scattering/low-energy ion scattering spectroscopy	SAM	scanning Auger microscope/microscopy
LPE	liquid phase epitaxy	SARS	scattering and recoiling ion spectroscopy
M		SAW	surface acoustic wave
MBE	molecular-beam epitaxy	SBZ	surface Brillouin zone
MD	molecular dynamics	SCLS	surface core level shift
MEED	medium-energy electron diffraction	SDR	surface differential reflectivity
MEIS	medium-energy ion scattering/medium-energy ion scattering spectroscopy	SEM	scanning electron microscope
MFM	magnetic force microscopy	SEXAFS	surface-sensitive EXAFS
ML	monolayer	SFG	sum frequency generation
MOCVD	metal-organic chemical vapor deposition	SH	second harmonic
MOKE	magneto-optical Kerr effect	SHG	second-harmonic generation
MOSFET	MOS field-effect transistor	SI	Système International d'Unités
MQW	multiple quantum well	SIMS	secondary-ion mass spectroscopy
N		SNR	signal-to-noise ratio
NICISS	neutral impact collision ion scattering spectroscopy	SPARPES	spin polarized angle-resolved photoemission spectroscopy
NIMs	National Institutes for Metrology	SPIPES	spin-polarized inverse photoemission spectroscopy
O		SPLLED	spin-polarized
OPO	optical parametric oscillation	SPV	surface photovoltage spectroscopy
P		SQUIDS	superconducting quantum interference devices
PDS	photothermal displacement spectroscopy	SS	surface state
PED	photoelectron diffraction	STM	scanning tunneling microscope/microscopy
PES	photoemission spectroscopy	STS	scanning tunneling spectroscopy
PLAP	pulsed laser atom probe	SXRD	surface X-ray diffraction
PLD	pulsed laser deposition	T	
PSZ	stabilized zirconia	TAFF	thermally activated flux flow
PZT	piezoelectric material	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
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