

## Appendix F. Glossary

2DEG	2-dimensional electron gas
A/D	Analog to digital
AAAR	American Association for Aerosol Research
ADC	Analog-digital converter
AEM	Analytical electron microscopy
AFM	Atomic force microscope/microscopy
AFOSR	Air Force Office of Scientific Research
AIST	(Japan) Agency of Industrial Science and Technology
AIST	(Japan, MITI) Agency of Industrial Science and Technology
AMLCD	Active matrix liquid crystal display
AMM	Amorphous microporous mixed (oxides)
AMO	Atomic, molecular, and optical
AMR	Anisotropic magnetoresistance
ARO	(U.S.) Army Research Office
ARPES	Angle-resolved photoelectron spectroscopy
ASET	(Japan) Association of Super-Advanced Electronics Technologies
ASTC	Australia Science and Technology Council
ATP	(Japan) Angstrom Technology Partnership
ATP	Adenosine triphosphate
<i>B</i>	Magnetic flux density
B/H loop	Closed figure showing <i>B</i> (magnetic flux density) compared to <i>H</i> (magnetic field strength) in a magnetizable material—also called hysteresis loop
bcc	Body-centered cubic
BMBF	(Germany) Ministry of Education, Science, Research, and Technology (formerly called BMFT)
BOD-FF	Bond-order-dependent force field
BRITE/EURAM	Basic Research of Industrial Technologies for Europe, European Research on Advanced Materials program
CAD	Computer-assisted design
CAIBE	Chemically assisted ion beam etching
CBE	Chemical beam epitaxy

CBED	Convergent beam electron diffraction
cermet	Ceramic/metal composite
CIP	Cold isostatic press
CMOS	Complementary metal-oxide semiconductor
CMP	Chemical mechanical polishing
CMR	Colossal magnetoresistance
CNRS	(France) Centre National de la Recherche Scientifique
CNSF	China National Science Foundation
CRMD	Centre de Recherche sur la Matière Divise (part of CNRS, France)
CRT	Cathode ray tube
CSM	Covalent shell model
CVD	Chemical vapor deposition
CVI	Chemical vapor infiltration
D/A	Digital to analog
DARPA	(U.S.) Defense Advanced Research Projects Agency
DM	Deutsche mark
DOC	(U.S.) Department of Commerce
DOD	(U.S.) Department of Defense
DOE	(U.S.) Department of Energy
DSC	Differential scanning calorimetry
e-beam	Electron-beam (lithography, etc.)
EC	Evaporation/condensation generators
EC	European Community (or Commission)
ECAMI	European-Canadian Mesoscopic Initiative
ECNM	European Consortium on NanoMaterials
ECU	European currency unit
EDX(S)	Energy-dispersive X-ray (spectroscopy)
EELS	Electron energy loss spectroscopy
EM	Electromagnetic
ENEA	(Italy) National Agency for Energy, Environment and New Technologies
EPFL	(Switzerland) École Polytechnique Fédérale de Lausanne
EPSRC	(U.K.) Engineering and Physical Sciences Research Council
ERATO	(Japan) Exploratory Research for Advanced Technology Program
ERC	(U.S., University of Illinois) Engineering Research Center on Microelectronics
ESCA	Electron spectroscopy for chemical analysis

ESPRIT	European Commission's information technologies program
ESR	Electron spin resonance
esu	Electrostatic unit
ETL	(Japan) Electrotechnical Laboratory
ETRI	(Korea) Electronics and Telecommunications Research Institute
EUSPEN	European Society for Precision Engineering and Nanotechnology
EXAFS	Extended X-ray absorption fine structure spectroscopy
fcc	Face centered cubic
FCRA	(Japan) Fine Ceramics Research Association
FE	Field emission
FEG-TEM	Field-emission gun – transmission electron microscope
FET	Field effect transistor
FE-TEM	Field-emission transmission electron microscope/microscopy
FETs	Field-effect transistors
FF	Force field
FFr	French franc
FIB	Focused ion beam
FIFO	First in - first out
FIM	Field-ion microscope/microscopy
FM	Ferromagnetic
FOA	(Sweden) National Defense Research Institute
FPMD	First-principles molecular dynamics
FzK	(Germany) Forschungszentrum Karlsruhe
GC/MS	Gas chromatograph mass spectroscopy
GDS-DFT	Gaussian dual space density functional theory
GIC	Graphite intercalated composites
GMR	Giant magnetoresistance
GP	Guinier-Preston
GPC	Gas phase condensation
GPS	Global Positioning System
GSMBE	Gas source molecular beam epitaxy
GVB	Generalized valence bond
HBFF	Hessian-based force field
H <sub>c</sub>	Coercivity
HDDR	Hydrogenation disproportionation desorption recombination
HDS	Hydrodesulfurization
HFET	Heterojunction field effect transistor

HIP	Hot isostatic press
HMDS	Hexamethyl-disilazane
HOPG	Highly oriented pyrolytic graphic
HP	(U.S.) Hewlett-Packard
HPHT	High pressure/high temperature
HPLC	High performance liquid chromatography
HREM	High resolution electron microscope/microscopy
HRTEM	High resolution transmission electron microscope (see also HREM)
$T_c$	High superconducting transition temperature
i.d.	Inner diameter
IC	(France) Institut Curie
IC	Integrated circuit
icd	internal coordinate dynamics
IGC	Inert gas condensation
IMEC	(Belgium) Interuniversity MicroElectronics Center
IP	Ionization potential
IPE	(Switzerland) Institute of Experimental Physics at EPFL
IR	Infrared
ISDN	Integrated Services Digital Network
ITO	Indium tin oxide
I-V	Current-voltage
JFCC	(Japan) Japan Fine Ceramic Center
JIM	Japanese Institute of Metals
JRCAT	(Japan) Joint Research Center for Atom Technology
JSPS	Japan Society for the Promotion of Science
K	Degrees kelvin
KOH	Potassium hydroxide
KTH	(Sweden) Royal Institute of Technology
LCD	Liquid crystal display
LCT	Liquid crystal templating
LCVP	Laser-induced chemical vapor precipitation
LED	Light-emitting diode
LIGA	(German acronym) Lithographie, Galvanoformung, Abformung
LINK	(U.K.) nanotechnology programme
LPPCVD	Laser particle precipitation-aided chemical vapor deposition
LSI	Large scale integration/integrated (circuits)
LTMC	Layered transition metal chalcogenide

MA	Mechanical alloying
MBE	Molecular beam epitaxy
mCP	Microcontact printing
MD	Molecular dynamics
MEL-ARI	(Europe, ESPRIT) Microelectronics Advanced Research Initiative
MEMS	Microelectromechanical systems
MFM	Magnetic force microscopy
microSQUID	Micro-superconducting quantum interference device
MIMIC	Micromolding in capillaries
MITI	(Japan) Ministry of International Trade and Industry
MOCVD	Metal organic chemical vapor deposition
Monbusho	(Japan) Ministry of Education, Science, Sports, and Culture
MOS	Metal oxide semiconductor
MOSFET	Metal oxide semiconductor field-effect transistor
MOVPE	Metal organic vapor phase epitaxy
MPI	(Germany) Max Planck Institute(s)
MRAM	Magnetic random access memory
MR-CI	Multireference configuration interaction
MRI	Magnetic resonance imaging
MSC	(U.S., California Institute of Technology) Materials and Process Simulation Center
MTJ	Magnetic tunnel junction
mTM	Microtransfer molding
MWNT	Multiwalled nanotube
NAIR	(Japan) National Institute for Advanced Interdisciplinary Research
NASA	(U.S.) National Aeronautic and Space Administration
nc	Nanocrystalline
NCA	Nanoparticle chain aggregate
NCAP	Nematic curvilinear aligned phase material
NCCE	(U.S., NSF) National Center for Computational Electronics
NDL	(Taiwan) National Nano Device Laboratories
NEDO	(Japan) New Energy and Industrial Technology Development Organization
NEIMO	Newton-Euler inverse mass operator method for modeling
NEMD	Nonequilibrium molecular dynamics
NEOME	(Switzerland) Network for Excellence on Organic Materials for Electronics

NFR	(Sweden) Natural Sciences Research Council
NIH	(U.S.) National Institutes of Health
NION	(U.K.) National Initiative on Nanotechnology
NIRIM	(Japan) National Institute for Research in Inorganic Materials
NIST	(U.S.) National Institute of Standards and Technology
NMR	Nuclear magnetic resonance
NNUN	(U.S.) National Nanofabrication Users Network
NOR	not or (used in logic circuits)
NRC	(Canada, also Australia) National Research Council
NRIM	(Japan) National Research Institute for Metals
NRL	(U.S.) Naval Research Laboratory
NSF	(U.S.) National Science Foundation
NSOM	Near-field scanning optical microscope/microscopy
NSS	Nanoscale systems
NUTEK	(Sweden) National Board for Industrial and Technological Development
o.d.	Outer diameter
OECD	(Int'l.) Organization for Economic Cooperation and Development
OLED	Organic light-emitting device
OMBE	Organic molecular beam epitaxy
ONR	(U.S.) Office of Naval Research
PAN	Polyacrylonitrile
PB	Polybutadiene
PBC	Periodic boundary conditions
PCD	Polycrystalline diamond
PCR	Polymerase chain reaction
PDLC	Polymer-dispersed liquid crystals
PDMS	Polydimethylsiloxane
PHANTOMS	(Europe) program to investigate physics and technology of mesoscale systems
PL	Photoluminescence
PMMA	Polymethylmethacrylate
p-n junctions	Positive-negative
PoSAP	position-sensitive atom-probe
PS	Polystyrene
PS-GVB	Pseudospectral generalized valence bond
PVD	Physical vapor deposition

PVDF	Poly(vinylidene fluoride)
QCA	Quantum cellular automata
QCL	Quantum cascade lasers
QD or Q-dot	Quantum dot
QEq	Charge equilibration
QM	Quantum mechanics/mechanical
QUEST	(U.S.) Center for Quantized Electronic Structures, UCSB
rf	Radio frequency
RCMM	Reduced cell multipole method
redox	Reduction-oxidation
RGB	Red, green, blue
RHEED	Reflection high energy electron diffraction
RIE	Reactive ion etching
RIKEN	(Japan, STA) Institute of Physical and Chemical Research
RT	Room temperature
RTD	Resonant tunneling diode
SAM	Self-assembled monolayer
SAMIM	Solvent-assisted microcontact molding
SAW	Surface acoustic wave device
SAXS	Small angle X-ray scattering
SBIR	(U.S.) Small Business for Innovative Research program
SED	Single electron device
SELETE	(Japan) Semiconductor Leading Edge Technologies, Inc. (consortium)
SEM	Scanning electron microscope/microscopy
Sematech	(U.S.) Semiconductor Manufacturing and Technology Institute
SEMPA	Scanning electron microscopy with polarization analysis
SEP	Size-dependent evolutionary pattern
SET	Single-electron transistor
SFM	Scanning force microscopy/microscope
SFr	Swiss franc
SIMS	Secondary ion mass spectrometry
SINQ	(Switzerland) Spallation Neutron Source
SIRI	(Japan) Semiconductor Industry Research Institute
SMM	Scanning Maxwell-stress Microscope
SNOM	Scanning near-field optical microscopy
SOI	Silicon on insulator

SOQD	Self-organized quantum dot
SPC	Statistical process control
SPD	Superplastic deformation
SPM	Scanning probe microscopy
SQUID	Superconducting quantum interference device
SRC	(U.S.) Semiconductor Research Corporation
SRRC	(Taiwan) Synchrotron Radiation Research Center
STA	(Japan) Science and Technology Agency
STARC	(Japan) Semiconductor Technology Academic Research Center
STEM	Scanning transmission electron microscope/microscopy
STM	Scanning tunneling microscope/microscopy
STN	Super twisted nematic
STTR	(U.S.) Small Business Technology Transfer program
SUNY	(U.S.) State University of New York
SWNT	Single-walled nanotubes
T	tesla
TBC	Thermal barrier coating
TCR	Temperature coefficient of resistivity
TEM	Transmission electron microscope/microscopy
TFR	(Sweden) Research Council for Engineering Sciences
TFT	Thin film transistors
$T_M$	Melting temperature
TMS	Tech molecular sieves; family of transition metal oxides
TMV	Trapped magnetization vortice
TSR	Tetrahedral shaped recess
UFF	Universal force field
UFP	Ultrafine particle
UHV	Ultrahigh vacuum
UHV CVD	Ultrahigh vacuum chemical vapor deposition
UHV-FE-SEM	Ultrahigh vacuum field emission scanning electron microscope
UHV STM	Ultrahigh vacuum scanning tunneling microscope
ULSI	Ultra large scale integration/integrated (circuit)
VC	Vanadium-carbon
VCSELs	Vertical cavity surface-emitting lasers
VLSI	Very large scale integration/integrated (circuit)
WC/Co	Tungsten carbide/cobalt



WTEC	World Technology Division of the International Technology Research Institute at Loyola College, Baltimore, MD
XAS	X-ray absorption spectroscopy
XPS	X-ray photoemission spectroscopy
XRD	X-ray diffraction

