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B. IWGN REFERENCE MATERIALS

This is a list of key publications and conference proceedings sponsored by IWGN and participating agencies in the area of nanoscience, engineering and technology in the last two years.

The following documents have been prepared by the NSTC/CT/IWGN:

1. *National Nanotechnology Initiative*, internal NSTC/CT/IWGN report, reviewed by the President's Committee of Advisors on Science and Technology (PCAST) Nanotechnology Panel. Expected release in Feb. 2000 (see <http://www.nsf.gov/nano>).
2. *Nanostructure Science and Technology* (NSTC Report), Siegel et al. 1999, eds., worldwide study on status and trends; available on the Web: <http://itri.loyola.edu/nano/IWGN.Worldwide.Study/>, on CD-ROM from WTEC, and hard cover publication by Kluwer Academic Publishers (1999).
3. *Nanotechnology Research Directions: IWGN Workshop Report* (NSTC report), Roco et al. 1999, eds., providing input from the academic, private sector and government communities; available on the Web: <http://itri.loyola.edu/nano/IWGN.Research.Directions/> (this report).
4. *Nanotechnology – Shaping the World Atom by Atom* (NSTC report), I. Amato, brochure for the public (available on the Web at: <http://itri.loyola.edu/nano/IWGN.Public.Brochure/>).

Additional information on the National Nanotechnology Initiative will be posted on the Web at: <http://www.nsf.gov/nano>.

The following publications/proceedings prepared by different agencies since 1997 address specific scientific topics, technological issues or areas of relevance in nanoscale science and engineering:

- *R&D Status and Trends in Nanoparticles, Nanostructured Materials, and Nanodevices in the United States* (includes review of U.S. funding), sponsored by 7 agencies in 1997, Proceedings published in January 1998, R. Siegel, E. Hu and M.C. Roco, eds., WTEC, on the Web: <http://itri.loyola.edu/nano/US.Review/>
- *NSF-NIST Conference on Nanoparticles* (NSF and NIST, 1997), Proceedings, D.T. Shaw, M.C. Roco and R. Shull, eds.
- *Selfassembling* (NSF, 1997), Proceedings (1998), M. Tirrell, Ed.

- *Interdisciplinary Macromolecular Science and Engineering* (NSF, 1997), Workshop report (Brochure in colors, 1998), S. Stupp, ed.
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- *US-EC Workshop on Nano-biotechnology* (NSF, 1997), L. Jelinski, Workshop Report (Brochure in colors, 1998), Website: <http://www.bio.cornell.edu/nanobiotech/nbt.htm/>
- *A Research Needs Assessment: Future Use of Nanofabricated Materials in Energy Applications* (DOE, 1998), Y.M. Chiang and J.Y. Ying.
- *Thermal-chemical simulations* (DOE, 1998), Proceedings, D. Dixon and P.T. Cummings, eds.
- *BECON Proceedings* (NIH, 1998), Workshop report, H.G. Craighead et al., eds., Website: http://www.nih.gov/grants/becon/report_19980228.pdf, page 39.
- *Nanotubes and Nanoelectronics* (SRC/NASA Ames, 1998), Workshop Proceedings, D. Herr, M. Meyyappan and V. Zhirnov, eds.
- *Nanotechnology for the Soldier System* (ARO/DOD, 1998), Proceedings, T. Tassinari, ed.
- *Ultra Electronics Program Review* (DARPA/DOD, 1998), Proceedings, Website: <http://web-ext2.darpa.mil/eto/ULTRA/index.html>, G. Pomrenke, ed.
- *NANOSpace 98*, NASA Workshops on Nano-Micro Technology, 1998, Houston, Proceedings on CD-ROM in 1999.
- *Nanoscale Science, Engineering and Technology Research Directions*, Oak Ridge National Laboratory, 1999 (with focus on research opportunities and challenges for national laboratories), D.H. Lowndes et al., eds.
- *Condensed-Matter and Materials Physics* (National Research Council, 1999), publication supported by the DOC and NSF, National Academy Press, Washington, D.C., 1999.

C. GLOSSARY

A/D	Analog (to) digital
AES	Auger electron spectroscopy
AFM	Atomic force microscopy
AFOSR	Air Force Office of Scientific Research
AIM	Atomic imaging and manipulation
ALE	Atomic layer epitaxy
ATM	Asynchronous transmission mode
ATP	(U.S., Dept. of Commerce) Advanced Technology Program
ATP	Adenosine triphosphate (supplies energy for biochemical cellular processes)
bcc	body-centered cubic
BEEM	Ballistic electron emission microscope/microscopy
BEP	(Treasury Department) Bureau of Engraving and Printing
BES	(Department of Energy) Basic Energy Science Directorate
CAD-T	Computer-aided design and test
CAT (scan)	Computerized axial tomography
CD	Compact disk
Cermet	Ceramic-metal composite
CFU	Colony forming units
CMOS	Complementary metal-oxide semiconductor
CMP	Chemical mechanical polishing
CNT	Carbon nanotube
CPSE	Collaborative problem-solving environments
CPU	Central processing unit (e.g., of a computer)
CRT	Cathode ray tube
CVD	Chemical vapor deposition
D/A	Digital (to) analog
DARPA	Department of Defense Advanced Research Projects Agency
DesCArtES	(NSF funded) Distributed Center for Advanced Electronics Simulations
DFT	Density functional theory
DRAM	Dynamic random access memory
DURIP	(DOD program) Defense University Research Instrumentation Program
EELS	Electron energy loss spectroscopy
ERC	(NSF) Engineering and Research Center
ESM	Electronic support measures
ESPRIT	European Commission's information technologies program
EUV	Extreme ultraviolet
EXAFS	Extended X-ray absorption fine structure
fcc	Face centered cubic
FDA	Force discrimination assay
FED	(Japan) R&D Association for Future Electron Devices
FEL	Free electron laser
FET	Field effect transistor
FRET	Fluorescence resonance energy transfer
FWHM	Full width, half maximum
GMR	Giant magnetoresistance
GOALI	(NSF) Grant Opportunities for Academic Liaison with Industry
HDS	Hydrodesulfurization

HFET	Heterojunction field-effect transistor
HPMA	N-2-hydroxypropyl methacrylamide
HREELS (41)	High- resolution electron energy loss spectroscopy (EELS)
HREM	High-resolution electron microscopy
HVOF	High velocity oxygen fuel
IP	Ionization potential
IPO	Initial public offering
IR	Infrared
IWGN	(U.S., NSTC) Interagency Working Group on Nanoscience, Engineering and Technology
JPL	(U.S., NASA) Jet Propulsion Laboratory (Pasadena)
JSC	(NASA) Johnson Space Center
LANL	Los Alamos National Laboratory
LARC	(NASA) Langley Research Center
LED	Light-emitting diode
LFM	Lateral force microscopy
LISA	Lithographically-induced self-assembly
MBE	Molecular beam epitaxy
MD	Molecular dynamics
MEL-ARI	(Europe, ESPRIT) Advanced Research Initiative in Microelectronics
MEMS	Microelectromechanical systems
MFM	Magnetic force microscope/scopy
MITI	(Japan) Ministry of International Trade and Industry
MOMBE	Organometallic molecular beam epitaxy
MRI	Magnetic resonance imaging
MRM	Magnetic resonance microscope/scopy
MRSEC	(NSF) Materials Research Science and Engineering Center(s) (network)
MS	Mass spectrometry
M-TAS	Micro(scale)-total analysis system
MURI	(DOD) Multidisciplinary University Research Initiative
nano-TAS	Nano(scale) total analysis system
NASA	National Aeronautics and Space Administration
NCSA	(U.S.) National Computational Science Alliance (for high-performance computing)
NCSL	Nanocrystal super lattices
NDR	Negative differential resistance
NEMS	Nanoelectromechanical systems
NIL	Nanoimprint lithography
NIST	National Institute of Standards and Technology
nm	Nanometer
nM	Nanomanipulator
NMR	Nuclear magnetic resonance
NNUN	(U.S.) National Nanofabrication Users Network
NP	Non-deterministic polynomial
NQR	Nuclear quadrupole resonance
NREL	National Renewable Energy Laboratory
NSOM	Near-field scanning optical microscope/microscopy
NST	(DOD) Nanometer Science and Technology
NSTC	(U.S.) National Science and Technology Council
OMB	(U.S.) Office of Management and Budget

OMVPE	Organometallic vapor phase epitaxy
OPS	Operations per second
OPTO	(Europe/ESPRIT/MEL-ARI) Optoelectronic Interconnects for Integrated Circuits
PARC	(U.S./Xerox) Palo Alto Research Center
PDMS	Polydimethylsiloxane
PEEM	Photoemission electron microscope/microscopy
PI	Principal investigator
PMMA	Polymethylmethacrylate
PVR	Peak-to-valley ratio
PVS	Physical vapor synthesis
QCA	Quantum cellular automata
QMOS	Quantum metal oxide semiconductor
RAM	Random access memory
RCT	(JPL) Revolutionary Computing Technologies Program
RTD	Resonant tunneling diode
SAM	Self-assembled monolayer
SAMMS	Self-assembled monolayers on mesoporous supports
SBIR	(U.S.) Small Business Innovative Research (program)
SCM	Scanning capacitance microscope/scopy
SECM	Scanning electrochemical microscope/scopy
SEED	Self-electro-optic effect device
SEM	Scanning electron microscopes/microscopy
SET	Single electron transistor
SFA	Surface force apparatus
SIA	(U.S.) Semiconductor Industry Association
SMT	(U.S., Rutgers Univ.) Strategic Materials Program
SOAC	System on a chip
SPICE	Simulation Program with Integrated Circuit Emphasis (computer-aided design tool)
SPM	Scanning probe microscope/scopy
SRAM	Static random access memory
STC	(NSF) Science and Technology Center
STEM	Scanning transmission electron microscope
SThM	Scanning thermal microscope/scopy
STM	Scanning tunneling microscope/microscopy
STS	Scanning tunneling spectroscopy
STTR	(U.S.) Small Business Technology Transfer (program)
SWNT	Single-wall nanotube (also, "buckeytube")
TAS	Total analysis systems ("chem lab on a chip")
TEM	Transmission electron microscope/microscopy
Teramak	R&D program at Hewlett-Packard
TSRAM	Tunneling-based static RAM
UPS (41)	Ultraviolet photoelectron spectroscopy
URI	(U.S., DOD) University Research Initiative
UV	Ultraviolet
UV/VIS (41)	Ultraviolet/visible light
VCSEL	Vertical cavity surface emitting laser
XMDC	X-ray magnetic circular dichroism
XPS	X-ray photoelectron spectroscopy

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