

Grouped per subject :

- FIB general
- Plasma FIB
- Helium ion microscopy
- Gas assisted etching and deposition
- Cross-section imaging

- Applications
- TEM specimen preparation
- Atom probe tip preparation
- Failure analysis
- Device modification
- Chemical analysis
- Biological applications

FIB : Focused Ion Beam

Ion channeling effects in scanning ion microscopy with a 60 keV Ga+ probe

R. Levi-Setti, T.R. Fox and K. Lam

Nucl. Inst. Methods Phys. B 205, 299 (1983).

Secondary electron yields from clean polycrystalline metal surfaces bombarded by 5-20 keV hydrogen or noble gas ions

P.C. Zalm and L.J. Beckers

Philips J. Res. 39, 61 (1984).

Registration mark detection for scanning ion beam lithography

A.F. Evasion, J.R.A. Cleaver, P.J. Heard and H. Ahmed

Electron. Lett. 21, 629 (1985).

Characteristics of silicon removal by fine focused gallium ion beam

H. Yamaguchi, A. Shimase, S. Haraichi and T. Miyauchi

J. Vac. Sci. Technol. B 3, 71 (1985).

The relationship between electron and ion induced secondary electron imaging: a review with new experimental observations

S.Y. Lai, D. Briggs, A. Brown, J.C. Vickerman

Surf. Interface Anal. 8, 93 (1986).

Focused Ion Beam Technology and Applications

A.J. Steckl, J.C. Corelli and J.F. McDonald

in : Emerging Technologies for In-Situ Processing, eds. D.J. Ehrlich and V.Tran Nguyen, (NATO ASI Series, M. Nijhoff Publishers,) pp. 179-199 (1988).

Scanning Ion Beam Techniques for the Examination of Microelectronic Devices

J.R.A. Cleaver, E.C.G. Kirk, R.J. Young and H. Ahmed

J. Vac. Sci. Technol. B 6, 1026 (1988).

Focused Ion Beam Technology: A Bibliography

R. A. D. Mackenzie et al

Nanotechnology 1, 163 (1990).

Focused ion beam imaging of grain growth in copper thin films

J. Gupta, J.M.E. Harper, J.L. Mauer, P.G. Blauner, D.A. Smith

Appl. Phys. Lett. 61, 663 (1992).

Contrast Mechanisms in Focused Ion Beam Imaging

T.K. Olson, R.G. Lee, J.C. Morgan

in : Proc. 18th International Symposium for Testing and Failure Analysis (ISTFA 92), (ASM International, Materials Park, Ohio) pp. 373-382 (1992).

New Characterization Method of Ion Current-Density Profile Based on Damage Distribution of Ga+ Focused-Ion Beam Implantation in GaAs

G. Ben Assayag, C. Vieu, J. Gierak, P. Sudraud, A. Corbin

J. Vac. Sci. Technol. B 11, 2420 (1993).

Rapid thermal annealing effects on Si p+-n junctions fabricated by low-energy FIB Ga+ implantation

H.C. Mogul and A.J. Steckl

IEEE Electron Device Lett. 14, 123 (1993).

Focused Ion Beam Damage-Etch Patterning for Isolation of Quantum Structures in AlGaAs/GaAs

I.M. Templeton, M. Fallahi, S. Charbonneau, H.G. Champion, L.B. Allard

J. Vac. Sci. Technol. B 11, 2416 (1993).

Using Optimum Magnification as a Figure of Merit to Evaluate the Performance of Focused Ion Beam Columns

R. Hill

SPIE 2014, 112 (1993).

Design of a 200 kV FIB system with a liquid metal ion source for IC process inspection

R. Mimura, H. Sawaragi, R. Aihara, M. Takai

Microelectron Eng. 21, 205 (1993).

Contrast formation in focused ion beam images of polycrystalline aluminum

D.L. Barr, W.L. Brown

J. Vac. Sci. Technol. B 13, 2580 (1995).

Monte Carlo Simulation of Ion Bombardment at Low Glancing Angles

T. Ishitani

Jpn. J. Appl. Phys. 34, 3303 (1995).

Toward a Commercial Gas Field Ion Source

W. Thompson, A. Armstrong, S. Etchin, R. Hill, S. Kalbitzer, R. Percival, A. Saxonis, Ch. Wilbertz

SPIE 2437, 284 (1995).

Fundamental limits to imaging resolution for focused ion beams

J. Orloff, L.W. Swanson, M. Utlaut

J. Vac. Sci. Technol. B 14, 3759 (1996).

Investigations of the Topology of Structures Milled and Etched by Focused Ion Beams

S. Lipp, L. Frey, C. Lehrer, B. Frank, E. Demm, H. Ryssel

J. Vac. Sci. Technol. B 14, 3996 (1996).

Focused ion beam sputter yield change as a function of scan speed

D. Santamore, K. Edinger, J. Orloff, J. Melngailis

J. Vac. Sci. Technol. B 15, 2346 (1997).

Evidence of Depth and Lateral Diffusion of Defects During Focused Ion Beam Implantation

C. Vieu, J. Gierak, M. Schneider, G. Ben Assayang and J.Y. Marzin

J. Vac. Sci. Technol. B 16, 1919 (1998).

Development of an Ion and Electron Dual Focused Beam apparatus for three-dimensional microanalysis

T. Sakamoto, Z. Cheng, M. Takhashi, M. Owari and Y. Nihei

Jpn. J. Appl. Phys. 37, 2051 (1998).

Contrast mechanisms in scanning ion microscope imaging for metals

Y. Sakai, T. Yamada, T. Suzuki, T. Sato, H. Itoh, T. Ichinokawa

Appl. Phys. Lett. 73, 611 (1998).

Channeling effects during focused-ion-beam micromachining of copper

J.R. Phillips, D.P. Griffis, P.E. Russel

J. Vac. Sci. Technol. A 18, 1061 (2000).

Microstructure and strain in Electroplated Copper Interconnects

R. Spolenak, D.L. Barr, M.E. Gross, K. Evans-Lutterodt, W.L. Brown, N. Tamura, A.A. Macdowell, R.S. Celestre, H.A.

Padmore, B.C. Valek, J.C. Bravman, P. Flinn, T. Marieb, R.R. Keller, B.W. Batterman, J.R. Patelk

Mat. Res. Soc. Proc. Vol. 612, D10.3.1 (2000).

Ion channeling effects on the focused ion beam milling of Cu

B.W. Kempshall, S.M. Schwarz, B.I. Prentizer, L.A. Giannuzzi, R.B. Irwin, F.A. Stevie

J. Vac. Sci. Technol. B 19, 749 (2001).

Inline failure analysis on productive wafers with duoa beam SEM/FIB-systems

R. Weiland, et al

SPIE 4406, 21 (2001).

Focused ion beam induced surface amorphization and sputter process

B. Basnar, A. Lugstein, H. Wanzenboeck, H. Langfischer, E. Bertagnoli and E. Gornik

J. Vac. Sci. Technol. B 21, 927 (2003).

High Resolution Focused Ion Beams, FIB and Its Applications

J. Orloff, M. Utlaut, L. Swanson

in : , (Kluwer Academic / Plenum Publishers,) pp. - (2003).

Formation of self-organized nanostructures on Ge during focused ion beam sputtering

W. Zhou, A. Cuenat, M.J. Aziz

Inst. Phys. Conf. Ser. 180, 625 (2003).

Measurement of Ga implantation profiles in teh sidewall and bottom of focused-ion-beam-etched structures

C.-M. Park, J.A. Bain, T.W. Clinton, P.A.A. van der Heijden and T.J. Klemmmer

Appl. Phys. Lett. 84, 3331 (2004).

Measurement of Ga implantation profiles in the sidewall and bottom of focused-ion-beam-etched structures

C.-M.Park, J.A.Bain, T.W.Clinton, P.A.A. Heijden and T.J.Klemmer

Appl. Phys. Lett. 84, 3331 (2004).

Gallium artefacts on FIB-milled silicon samples

J.C. Reiner, P. Nellen, U. Sennhauser

Microelectron. Reliab. 44, 1583 (2004).

Introduction to Focused Ion Beams - Instrumentation, Theory, Techniques and Practice

in : , eds. L.A. Giannuzzi, F.A. Stevie, (Springer,) pp. - (2005).

DB FIB for in-line process control

H. Bloess, U. Mantz, C. Henry, R., Lehmann and D. Hahn

AIP Conference Proc. 788, 543 (2005).

Focused Ion Beam Systems, Basics and Applications

in : , eds. Nan Yao, (Cambridge University Press,) pp. - (2007).

Ion beam mixing by focused ion beam

A. Barna, L. Kotis, J.L. Labar, Z.Osvath, A.L. Toth, M. Menyhard, A. Zalar and P. Panjan
J. Appl. Phys. 102, 053513 (2007).

Focused ion beam microscopy and micromachining

C.A. Volkert and A.M. Minor
MRS Bull. 32, 389 (2007).

Handbook of Charged Particle Optics, 2nd Ed ; Chapter 11 "Focused ion beam"

M. Utlaut
in : , eds. Jon Orloff, (CRC Pres,) pp. - (2008).

SSRM characterisation of FIB induced damage in silicon

S. Beuer, V. Yanev, M. Rommel, A.J. Bauer and H. Ryssel
J. Phys. Conf. Ser. 100, 052007 (2008).

Sputtering limits versus signal-to-noise limits in the observation of Sn balls in a Ga+ microscope

V. Castaldo, C.W. Hagen, B. Rieger, P. Kruit
J. Vac. Sci. Technol. B 26, 2107 (2008).

Focused Ion-Beam Based Nanohole Modelling, Simulation, Fabrication, and Application

J. Zhou and G. Yang
J. Man. Sc. Eng. 132, 011005 (2010).

MOTIS: A Focused Ion Beam Source Based On LaserCooled Atoms

B. Knuffman, A V. Steele, J. Orloff, M. Maazouz and J.J. McClelland
AIP Conference Proc. 1395, 85 (2011).

Focused Ion Beam Lithography

H.D. Wanzenboeck and S. Waid
in : Recent Advances in Nanofabrication Techniques and Applications, chapter 2, eds. Bo Cui, (InTech,) pp. - (2011).

Nanofabrication Using Focused Ion and Electron Beams, Principles and Applications

in : , eds. I. Utke, S. Moshkalev, P. Russell, (Oxford University Press,) pp. - (2012).

FIB Endpoint Detection and Depth Resolution

R. Lee, J. Morgan, R. Hill, T. Olson
Microelectron Eng. 21, 201 (2012).

The significance of redeposition and backscattering in nanostructure formation by focused ion beams

S. Lindsey and G. Hobler
Nucl. Inst. Methods Phys. B 282, 12 (2012).

Probe current distribution characterization technique for focused ion beam

S.Tan, R. Livengood, Y. Greenzweig, Y. Drezner, D. Shima
J. Vac. Sci. Technol. B 30, 06F606 (2012).

Focused Ion Beams

Y. Wang
in : Nanotechnology Research Methods for Foods and Bioproducts, chapter 11, eds. G.W. Padua and Q. Wang, (Wiley-Blackwell, Oxford) pp. - (2012).

FIB Nanostructures

in : Lecture Notes in Nanoscience and Technology 20, eds. Z.M. Wang, (Springer,) pp. - (2013).

Site-specific metrology, inspection, and failure analysis of three-dimensional interconnects using focused ion beam technology

F. Altmann, R.J. Young
J. Micro/Nanolitho MEMS MOEMS 13, 011202 (2014).

Introduction to Focused Ion Beam Nanometrology

David C. Cox

in : , (Morgan & Claypool Publishers,) pp. - (2015).

Surface contamination and electrical damage by focused ion beam: conditions applicable to the extraction of TEM lamellae from nanoelectronic devices

H. Bender, A. Franquet, C. Drijbooms, B. Parmentier, T. Clarysse, W. Vandervorst, L. Kwakman
Semicond. Sci. Technol 30, 114015 (2015).

Genesis of focused ion beams for plasma nanotechnology using a bounded microwave plasma source

S. Bhattacharjee and S.Paul
Jpn. J. Appl. Phys. 54, 01AA06 (2015).

Reconstructing focused ion beam current density profile by iterative simulation methodology

E. Chang, K. Toula and V. Ray
J. Vac. Sci. Technol. B 34, 06KO01 (2016).

Bright focused ion beam sources based on laser-cooled atoms

J.J. McClelland, A.V. Steele, B. Knuffman, K.A. Twedt, A. Schwarzkopf, T.M. Wilson.
Appl. Phys. Rev. 3, 011302 (2016).

Prediction of surface topography due to finite pixel spacing in FIB milling of rectangular boxes and trenches

N.I. Borgardt and A.V. Rumyantsev
J. Vac. Sci. Technol. B 34, 061803 (2016).

Current density profile characterization and analysis method for focused ion beam

Y. Greenzweig, Y. Drezner, S. Tan, R.H. Livengood, A. Raveha
Microelectron Eng. 155, 19 (2016).

High resolution TEM analysis of focused ion beam amorphized regions in single crystal silicon - A complementary materials analysis of the teardrop method

Y. Greenzweig, Y. Drezner, S.Tan, R.H. Livengood, A. Raveha
J. Vac. Sci. Technol. B 35, 011801 (2017).

FIB : Plasma FIB

Ga+ beam lithography for nanoscale silicon reactive ion etching

M.D. Henry, M. J. Shearn, B. Chhim and A. Scherer
Nanotechnology 21, 245303 (2010).

Metrology and Failure Analysis for 3D IC Integration

E. Zschech and A. Diebold
AIP Conference Proc. 1395, 233 (2011).

Characterization and Failure Analysis of 3D Integrated Systems using a novel plasmaFIB system

L. Kwakman, G. Franz, M.M. Visser Taklo, A. Klumpp and P. Ramm
AIP Conference Proc. 1395, 269 (2011).

Xe+ FIB Milling and Measurement of Amorphous Silicon Damage

R. Kelley, K. Song, B. Van Leer, D. Wall, L. Kwakman
Microsc. Microanal. 19, 862 (2013).

Fast and easy sample preparation with reduced curtaining artifacts using a P-FIB

S. Moreau, D. Bouchu and G. Audoit
in : Proc.21st International Symposium on the Physical and Failure Analysis of Integrated Circuits (IPFA), (IEEE,) pp. 231-235 (2014).

Plasma FIB: enlarge your field of view and your field of applications

A. Garnier, G. Filoni, T. Hrncir, L. Hladik

Microelectron. Reliab. 55, 2135 (2015).

Ti and its alloys as examples of cryogenic focused ion beam milling of environmentally-sensitive materials

Y. Chang, W. Lu, J. Guénolé, LT. Stephenson, A. Szczpaniak, P. Kontis, A.K. Ackerman, F.F. Dear, I. Mouton, X.

Zhong, S. Zhang, D. Dye, C.H. Liebscher, D. Ponge, S. Korte-Kerzel, D. Raabe and B.Gault

Nature Comm. 10:942, 1 (2019).

FIB : Helium ion microscopy

Scanning He+ Ion Beam Microscopy and Metrology

D.C. Joy

AIP Conference Proc. 1395, 80 (2011).

Implications of Helium and Neon Ion Beam Chemistry for Advanced Circuit Editing

H. Wu, D. Ferranti, L.A. Stern, D. Xia, M.W. Phaneuf

in : Proc. 39th International Symposium for Testing and Failure Analysis (ISTFA 2013), (ASM International, Materials Park, Ohio) pp. 118-122 (2013).

Helium Ion Microscopy (HIM) for the imaging of biological samples at sub-nanometer resolution

M.S. Joens, C. Huynh, J.M. Kasuboski, D. Ferranti, Y.J. Sigal, F. Zeitvogel, M. Obst, C.J. Burkhardt, K.P. Curran, S.H. Chalasani, L.A. Stern, B. Goetze, J.A.J. Fitzpatrick

Scient. Reports 3, 3514 (2013).

Evaluation of EUV resist performance below 20-nm CD using helium ion lithography

D. Maas, E. van Veldhoven, A. van Langen-Suurling, P.F.A. Alkemade, S. Wuister, R. Hoefnagels, C. Verspaget, J. Meessen, T. Fliervoet

SPIE 9048, 90482Z-1 (2014).

High-resolution direct-write patterning using focused ion beams

L.E. Ocola , C. Rue, D. Maas

MRS Bull. 39, 336 (2014).

Sub-50 nm metrology on extreme ultra violet chemically amplified resist — A systematic assessment

D. J. Maas, T. Fliervoet, R. Herfst, E. van Veldhoven, J. Meessen, V. Vaenkatesan, H. Sadeghian

Review Sc Instr. 86, 103702 (2015).

FIB : Gas assisted etching and deposition

Silicon oxide film formation by Focused Ion Bean (FIB)-Assisted Deposition

H. Komano, Y. Ogawa and T. Takigawa

Jpn. J. Appl. Phys. , 2372 (1989).

Focused Ion Beam Induced Deposition

J. Melngailis, P.G. Blauner, A.D. Dubner, J.S. Ro, T. Tao, C.V. Thompson

in : Proc. 2nd Int. Symp. Process Physics and Modelling in Semiconductor Technology, (Electrochem. Society,) pp. - (1990).

Gas-Assisted Focused Ion Beam Etching for Microfabrication and Inspection

R.J. Young, J.R.A. Cleaver, H. Ahmed

Microelectron Eng. 11, 409 (1990).

Reduction of Induced Damage in GaAs Processed by Ga+ Focused-Ion-Beam-Assisted Cl₂ Etching

Y. Sugimoto, M. Taneya, H. Hidaka and K. Akita

J. Appl. Phys. 68, 2392 (1990).

Focused ion beam assisted etching of quartz in XeF₂ without transmittance reduction for phase shifting mask repair

H. Nakamura, H. Komano, M. Ogasawara
Jpn. J. Appl. Phys. 31, 4465 (1992).

Focused ion beam induced deposition of copper

A.D. Della Ratta, J. Melngailis and C.V. Thompson
J. Vac. Sci. Technol. B 11, 2195 (1993).

Focused-ion-beam-induced tungsten deposition for IC repair

F.C. van den Heuvel, M.H.F. Overwijk, E.M. Fleuren, H. Laisina, K.J. Sauer
Microelectron Eng. 21, 209 (1993).

Digital Scan Model for Focused Ion Beam Induced Gas Etching

L.R. Harriot
J. Vac. Sci. Technol. B 11, 2012 (1993).

Characteristics of Gas-Assisted Focused Ion Beam Etching

R.J. Young, J.R.A. Cleaver and H. Ahmed
J. Vac. Sci. Technol. B 11, 234 (1993).

Gas-Assisted Etching with Focused Ion Beam Technology

J.D. Casey, A. F. Doyle, R.G. Lee, D. K. Stewart, H. Zimmermann
Microelectron Eng. 24, 43 (1994).

Gas Assisted Etching : An Advanced Technique for Focused Ion Beam Device Modification

M. Abramo, L. Hahn, L. Moszkowicz
in : Proc. 20th International Symposium for Testing and Failure Analysis (ISTFA 94), (ASM International, Materials Park, Ohio) pp. 439-446 (1994).

Electrical Characterization of Focused Ion Beam Induced Platinum Deposition

S.X. Li, L.O. Toyoshiba, E. Delenia and S. Kazmi
in : Proc. 20th International Symposium for Testing and Failure Analysis (ISTFA 94), (ASM International, Materials Park, Ohio) pp. 425-429 (1994).

Focused Ion Beam Deposition of New Materials : Dielectric Films for Device Modification and Mask Repair, and Tantalum Films for X-Ray Mask Repair

D.K. Stewart, A.F. Doyle, J.D. Casey
SPIE 2437, 276 (1995).

Focused Ion Beam Insulator Deposition

J.R. Baker
in : Proc. 21st International Symposium for Testing and Failure Analysis (ISTFA 95), (ASM International, Materials Park, Ohio) pp. 43-47 (1995).

Focused ion beam insulator deposition

R.J. Young, Puretz J.
J. Vac. Sci. Technol. B 13, 2576 (1995).

Local Material Removal by Focused Ion Beam Milling and Etching

S. Lipp, L. Frey, G. Franz, E. Demm, S. Petersen, H. Ryssel
Nucl. Inst. Methods Phys. B 106, 630 (1995).

H₂O enhanced focused ion beam micromachining

T.J. Stark, G.M. Shedd, J. Vitarelli, D.P. Griffis, P.E. Russell
J. Vac. Sci. Technol. B 13, 2565 (1995).

Ion beam assisted etching of SiO₂ and Si₃N₄

Z. Xu, K. Gamo, S. Namba

J. Vac. Sci. Technol. B 6, 1039 (1995).

Development of focused ion-beam machining techniques for permalloy structures

D.M. Thaus, T.J. Stark, D.P. Griffis, P.E. Russell

J. Vac. Sci. Technol. B 14, 3928 (1996).

Low Resistivity FIB Depositions Within High Aspect Ratio Holes

R.A. Lee and T.R. Lundquist

in : Proc. 22nd International Symposium for Testing and Failure Analysis (ISTFA 96), (ASM International, Materials Park, Ohio) pp. 85-88 (1996).

Tetramethoxysilane as a Precursor for Focused Ion Beam and Electron Beam Assisted Insulator SiO_x Deposition

S. Lipp, L. Frey, C. Lehrer, B. Frank, E. Demm, S. Pauthner, H. Ryssel

J. Vac. Sci. Technol. B 14, 3920 (1996).

A comparison of Focused Ion Beam and Electron Beam Induced Deposition Processes

S. Lipp, L. Frey, C. Lehrer, E. Demm, S. Pauthner and H. Ryssel

Microelectron. Reliab. 36, 1779 (1996).

Characterization of Resist Profiles Using Water Enhanced Focused Ion Beam Micromachining

T.J. Stark, D.P. Griffis, P.E. Russell

J. Vac. Sci. Technol. B 14, 3990 (1996).

Electrical and Chemical Characterization of FIB-Deposited Insulators

A.N. Campbell, D.M. Tanner, J.M. Soden, D.K. Stewart, A. Doyle, E. Adams, M. Gibson, M. Abramo

in : Proc. 23rd International Symposium for Testing and Failure Analysis (ISTFA 97), (ASM International, Materials Park, Ohio) pp. 223-230 (1997).

The Usage of Focused Ion Beam Induced Deposition of Gold Film in IC Device Modification and Repair

R. Lee, M. Cecere

in : Proc. 23rd International Symposium for Testing and Failure Analysis (ISTFA 97), (ASM International, Materials Park, Ohio) pp. 121-123 (1997).

In-situ Dual Beam (FIBSEM) Techniques for Probe Pad Deposition and Dielectric Integrity Inspection in 0.2 um Technology DRAM Single Cells

G. Zimmermann and R. Chapman

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 311-316 (1999).

Investigation on the Corrosion of Cu Metallization in the Focused Ion Beam System due to a low I₂ Background

H. Bender, S. Jin, I. Vervoort and Y. Lantasov

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 135-140 (1999).

Gas assisted etching of copper with focused ion beams

K. Edinger

J. Vac. Sci. Technol. B 17, 3058 (1999).

Modelling and Optimizing XeF₂-enhanced FIB Milling of Silicon

N.J. Bassom and T. Mai

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 255-261 (1999).

Analysis of Ohmic Contact Metal Deposition Using FIB/SEM for a GaAs MESFET Clock Buffer IC Device

P. Tsai and W. Bornstein

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 343-348 (1999).

Investigation of Cu films by focused ion beam induced deposition using nuclear microprobe

Y.K. Park, M. Takai, C. Lehrer, L. Frey, H. Ryssel

Nucl. Inst. Methods Phys. B 158, 493 (1999).

Focused ion beam analysis of organic low-k dielectrics

H. Bender and R.A. Donaton

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 397-405 (2000).

Chemically enhanced focused ion beam micromachining of copper

J.C. Gonzalez, D.P. Griffis, T.T. Miau, P.E. Russell

J. Vac. Sci. Technol. B 19, 2539 (2001).

Comparative evaluation of protective coatings and focused ion beam chemical vapor deposition processes

B.W. Kempshall, L.A. Giannuzzi, B.I. Prentizer, F.A. Stevie, S.X. Da

J. Vac. Sci. Technol. B 20, 286 (2002).

Organochloride chemically enhanced focused ion beam micromachining of permalloy

D.M. Thaus, T.J. Stark, D.P. Griffis, P.E. Russell

Appl. Phys. Lett. 68, 3829 (2002).

Evolution of tungsten film deposition induced by focused ion beam

H. Langfischer, B. Basnar, H. Hutter, E. Bertagnolli

J. Vac. Sci. Technol. A 20, 1408 (2002).

Development of void-free focused ion beam-assisted metal deposition process for subhalf-micrometer high aspect ratio vias

V.Ray, N.Antoniou, N.Bassom, A.Krechmer and A.Saxonis

J. Vac. Sci. Technol. B 21, 2715 (2003).

Fluorocarbon Precursor for High Aspect Ratio Via Milling in Focused Ion Beam Modification of Integrated Circuits

V. Ray

in : Proceedings 30th International Symposium for Testing and Failure Analysis, ISTFA 2004, pp. 534-537 (2004).

Mechanical Characteristics of FIB Deposited Carbon Nanowires Using an Electrostatic Actuated Nano Tensile Testing Device

M. Kiuchi, S. Matsui and Y. Isono

J. Microelectromech Sys. 16, 191 (2007).

Protective Carbon Deposition for Superior FIB Prepared (S)TEM Specimens

B. Van Leer, Y.-C. Wang, L.A. Giannuzzi

Microsc. Microanal. 15, 336 (2009).

Failure Analysis of Through-Silicon-Vias Aided by High-Speed FIB Silicon Removal

P. Gounet, M. Mercier, D. Serre, C. Rue

in : IEEE Proceedings 16th IPFA, pp. 94-99 (2009).

Understanding and Modeling the Resistance of High Aspect Ratio FIB-Fabricated Tungsten Vias

D.W. Niles, W. Dauksher and R.W. Kee

J. Mater. Eng. Perf. 19, 900 (2010).

Reduced electrical impedance of SiO₂, deposited through focused ion beam based systems, due to impurity percolation

H. Faraby, M. DiBattista and P.R. Bandaru
J. Appl. Phys. 116, 204301 (2014).

Percolation of gallium dominates the electrical resistance of focused ion beam deposited metals

H. Faraby, M. DiBattista, P.R. Bandaru
Appl. Phys. Lett. 104, 173107 (2014).

Permittivity of SiO₂ for estimating capacitive delays in focused ion beam circuit edit

D.W. Niles, J. Stout, R. Christensen and R. Rodgers
J. Vac. Sci. Technol. B 33, 012203 (2015).

Methodology for Studying Nanoscale Details of Focused Ion Beam Gas-Assisted Etching and Deposition by TEM and Numerical Modeling

V. Ray, E. Chang, K. Toula, S.-C. Liou and W.-A. Chiou
Microsc. Microanal. 21, 1843 (2015).

FIB : Cross-section imaging

Condensation of Bombarding Gallium Ions on a Silicon Surface

T. Ishitani, A. Shimase and H. Tamura
Appl. Phys. Lett. 39, 627 (1981).

How to Decorate FIB Cross Sections Using Plasma Etch for SEM Observation

S.X. Li, A. Gray
in : Proc. 21st International Symposium for Testing and Failure Analysis (ISTFA 95), (ASM International, Materials Park, Ohio) pp. 347-351 (1995).

Layers Decoration on FIB Cross-sections

G. Perez, F. Courtade, B. Benteo, J. Lin-Kwan
Microelectron. Reliab. 37, 1611 (1997).

Focused Ion Beam and Transmission Electron Microscopy for Process Development

H. Bender
in : Analytical and Diagnostic Techniques for Semiconductor Materials, Devices, and Processes, eds. B.O. Kolbesen, C. Claeys, P. Stallhofer, F. Tardif, J. Benton, et al, (Electrochemical Society, Pennington) pp. 232-247 (1999).

Wafer conserving full range construction analysis for IC fabrication and process development based on FIB/Dual beam inline application

R. Weiland, C. Boit, N. Dawes, A. Dzieslaty, E. Demm, B. Ebersberger, L. Frey, S. Geyer, A. Hirsch, C. Lehrer, P. Meis, M. Kamolz, H. Lezec, H. Rettenmaier, W. Tittes, R. Treichler, H. Zimmermann
in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 393-396 (2000).

FIB : Applications

Focused-Ion Beam Micromachined AlGaAs Semiconductor Laser Mirrors

J. Puretz, R.K. DeFreez, R.A. Elliott, J. Orloff
Electron. Lett. 22, 700 (1986).

X-ray mask repair with focused ion beams

A. Wagner, J.P. Levin, J.L. Mauer, P.G. Blauner, S.J. Kirch, P. Longo
J. Vac. Sci. Technol. B 8, 1557 (1990).

Micromachining Using Focused Ion Beams

K. Gamo, S. Namba
Microelectron Eng. 11, 403 (1990).

Focused Ion Beam Applications for Design and Product Analysis

J.A. Lange, S. Czapski

in : Proc. 17th International Symposium for Testing and Failure Analysis (ISTFA 91), (ASM International, Materials Park, Ohio) pp. 397-400 (1991).

Electrochemical Capacitance-Voltage Depth Profiling of Nanometer-Scale Layers Fabricated by Ga+ Focused Ion Beam Implantation into Silicon

H.C. Mogul, A.J. Steckl, G. Webster, M. Pawlik and S. Novak

Appl. Phys. Lett. 61, 554 (1992).

Focused Ion Beam Process Monitoring

W.B. Thompson, R.G. Lee

SPIE 1673, 414 (1992).

Micro-Machining Using a Focused Ion Beam

R.J. Young

Vacuum 44, 353 (1993).

Electron-Beam Fabrication and Focused Ion Beam Inspection of Submicron Structured Diffractive Optical Elements

C. Dix, P.F. McKee, A.R. Thurlow, J.R. Towers, D.C. Wood, N.J. Dawes, J.T. Whitney

J. Vac. Sci. Technol. B 12, 3708 (1994).

Surface and Interface Study of Titanium Nitride on Si Substrate Produced by Dynamic Ion Beam Mixing Method

Y.W. Beag, M. Tarutani, K. Min, M. Kiuchi, R. Shimizu

Jpn. J. Appl. Phys. 33, 2025 (1994).

Applications of Focused Ion Beams in Microelectronics Production, Design and Development

F.A. Stevie, T.C. Shane, P.M. Kahora, R. Hull, D. Bahnck, V.C. Kannan, E. David

Surf. Interface Anal. 23, 61 (1995).

Focused Ion Beam Metrology

A. Wagner, P. Longo, S. Cohen, P. Blauner

Mat. Res. Soc. Proc. Vol. , (1996).

Focused Ion Beam Processing for Microscale Fabrication

J.F. Walker, D.F. Moore, J.T. Whitney

Microelectron Eng. 30, 517 (1996).

Effects of Focused Ion Beam Irradiation on MOS Transistors

A.N. Campbell, K.A. Peterson, D.M. Fleetwood, J.M. Soden

in : IEEE 35th Int. Rel. Physics Symposium Proceedings, pp. 72-81 (1997).

Nano- and Micro-Technology Applications of Focused Ion Beam Processing

D.F. Moore, J.H. Daniel, J.F. Walker

Microelectron. J. 28, 465 (1997).

Focused Ion-Beam Fabrication of Fiber Probes with Well-Defined Apertures for Use in Near-Field Scanning Optical Microscopy

S. Pilevar, K. Edinger, W. Atia, I. Smolyaninov and C. Davis

Appl. Phys. Lett. 72, 3133 (1998).

High aspect ratio all diamond tips formed by focused ion beam for conducting atomic force microscopy

A. Olbrich, B. Ebersberger, C. Boit, Ph. Niedermann, W. Hanni, J. Vancea and H. Hoffmann

J. Vac. Sci. Technol. B 17, 1570 (1999).

Electrical Properties of Si P+-n Junctions for Sub-0.25 um CMOS Fabricated by Ga FIB Implantation

H.C. Mogul, A.J. Steckl, E. Ganin

IEEE Trans. Electron Devices 40, 1823 (1999).

Nano-slit probes for near-field optical microscopy fabricated by focused ion beams

H.U. Danzebrink, Th. Dziomba, T. Sulzbach, O. Ohlsson, C. Lehrer and L. Frey

J. Microsc. 194, 335 (1999).

Creation of nanoelectronic devices by focussed ion beam implantation

J. Koch, K. Grun, M. Ruff, R. Wernhardt, A.D. Wieck

in : Industrial Electronics Society, 25th Annual Conference of the IEEE, pp. 35-39 (1999).

Focused ion beam microscopy investigation of InGaP/GaAs heterojunction bipolar transistors

A.J. Pidduck, C. Reeves, G.M. Williams, M.A. Crouch, D.G. Hayes, K. Hilton, P. Parmiter, J. Birbeck and A. Schertel
Inst. Phys. Conf. Ser. 164, 585 (2000).

Lorentz transmission electron microscopy of focused ion beam patterned magnetic antidot arrays

A.Y. Toporov, R.M. Langford, A.K. Petford-Long

Appl. Phys. Lett. 77, 3063 (2000).

Integrated circuit SNR improvement using dielectric altering compound, laser trim and FIB system

B.J. Dutt, J.J. Kroutch, K.N. Hooghan, R.J. Jenkins and M.J. Toth

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 323-326 (2000).

Room temperature recrystallization of electroplated copper thin films : methods and mechanisms

D. Walther, M.E. Gross, K. Evans-Lutterodt, W.L. Brown, M. Oh, S. Merchant, P. Naresh

Mat. Res. Soc. Proc. Vol. 612, D10.1.1 (2000).

Focused Ion Beam Structuring of Si and Si/CoSi₂ Heterostructures using Adsorbed Hydrogen as a Resist

H. Fuhrmann, M. Döbeli, R. Mühle, M. Suter

J. Vac. Sci. Technol. B 17, 945 (2000).

Combining FIB sequential cross-sectioning with TEM for small defect analysis in SRAM array

N. Wang and R. Fang

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 309-313 (2000).

A review of focused ion beam applications in microsystem technology

S. Reyntjens and R. Puers

J. Micromech. Microeng. 11, 287 (2001).

Materials Analysis and Process Monitoring in Megafabs

B. Tracy

in : Proc. 28th International Symposium for Testing and Failure Analysis (ISTFA 2002), (ASM International, Materials Park, Ohio) pp. 69-75 (2002).

Advanced sub 0.13 um Cu devices - Failure analysis and circuit edit with improved FIB chemical processes and beam characteristics

J.D. Casey, C. Chandler, M. Megorden, Th. J. Gannon, A. Krechmer, D. Monforte, N. Antoniou, N. Bassom, P. Carleson, C. Huynh, B. Silva, R. Hill, G. Gu, V. Ray, A. Saxonis, M. Phaneuf and J. Li

in : Proc. 28th International Symposium for Testing and Failure Analysis (ISTFA 2002), (ASM International, Materials Park, Ohio) pp. 553-557 (2002).

Electromigration study of Cu/low k dual-damascene interconnects

K.D. Lee, X. Lu, E.T. Ogawa, H. Matsuhashi, P.S. Ho

in : IEEE 40th Annual International Reliability Physics Symposium, pp. 322-326 (2002).

Orientation imaging microscopy applications in Cu-interconnects and Cu-Cu wire bonding

P. Ratchev, L. Carbonell, H.M. Ho, H. Bender, I. De Wolf, B. Verlinden

in : Proc. 28th International Symposium for Testing and Failure Analysis (ISTFA 2002), (ASM International, Materials Park, Ohio) pp. 61-66 (2002).

Preparation of TEM samples by focused ion beam (FIB) techniques: applications to the study of clays and phyllosilicates in meteorites

M.R. Lee, P. A. Bland, G. Graham

Min. Mag. 67, 581 (2003).

Focused-ion-beam-based rapid prototyping of nanoscale magnetic devices

S. Khizroev and D. Litvinov

Nanotechnology 15, (2004).

Application of the dual-beam FIB/SEM to metals research

V.G.M. Sivel, J. Van den Brand, W.R. Wang, H. Mohdadi, F.D. Tichelaar, P.F.A Alkemade and H.W. Zandbergen
J. Microsc. 214, 237 (2004).

Metrology, inspection and process control for microlithography

N. Bicais-Lépinay, et al

SPIE 6152, 615217 (2006).

Optical improvement of photonic devices fabricated by Ga+ focused ion beam micromachining

Hai-Hua Tao, Cheng Ren, Shuai Feng, Ya-Zhao Liu, Zhi-Yuan Li, Bing-Ying Cheng, Dao-Zhong Zhang and Ai-Zi Jin
J. Vac. Sci. Technol. B 25, 1609 (2007).

Producing metastable nanophase with sharp interface by means of focused ion beam irradiation

A. Barna, L. Kotis, J. Labar, Z.Osvath, A.L. Toth, M. Menyhard, A. Zalar and P. Panjan

in : , pp. 044305- (2009).

Dual-beam focused ion beam/electron microscopy processing and metrology of redeposition during ion-surface 3D interactions, from micromachining to self-organized picostructures

W.J. Moberly Chan

J. Phys.: Condens Matter 21, 224013 (2009).

Focused ion beam fabrication of spintronic nanostructures: an optimization of the milling process

M. Urbanek, V. Uhlir, P. Babor, E. Kolibalova, T. Hrncir, J. Spousta and T. Sikola

Nanotechnology 21, 145304 (2010).

Focused ion beam contact to non-volatile memory cells

C. Helfmeier, R. Schlangen, C. Boit

Microelectron. Reliab. 54, 1798 (2014).

Low temperature FIB cross section: example on indium micro bumps

I. Dantas de Morais, S. Chevalliez, S. Mouleres

Microelectron. Reliab. 54, 1802 (2014).

Efficient and flexible Focused Ion Beam micromachining of Solid Immersion Lenses in various bulk semiconductor materials - an adaptive calibration algorithm

P. Scholz, N. Herfurth, M. Sadowski, T. Lundquist, U. Kerst, C. Boit

Microelectron. Reliab. 54, 1794 (2014).

Formation of coupled-cavities in quantum cascade lasers using focused ion beam milling

A. Czerwinski, M. Pluska, A. Laszcz, J. Ratajczak, K. Pierscinski, D. Pierscinska, P. Gutowski, P. Karbownik, M. Bugajski

Microelectron. Reliab. 55, 2142 (2015).

Fabrication of advanced probes for atomic force microscopy using focused ion beam

O.A. Ageev, A.S. Kolomiytsev, A.V. Bykov, V.A. Smirnov, I.N. Kots

Microelectron. Reliab. 55, 2131 (2015).

Ga+ focused ion beam lithography as a viable alternative for multiple fin field effect transistor prototyping

A. Leonhardt, M.V. Puydinger dos Santos, J. Alexandre Diniz and L. Tiago Manera

J. Vac. Sci. Technol. B 34, 06KA03 (2016).

Rapid Focused Ion Beam Milling Based Fabrication of Plasmonic Nanoparticles and Assemblies via "Sketch and Peel" Strategy

Y. Chen , K. B, Q.Wang, M. Zheng, Q. Liu, Y. Han, J. Yang, S. Chang, G. Zhangll and H. Duan

ACS Nano 10, 11228 (2016).

Lithography-free positioned GaAs nanowire growth with focused ion beam implantation of Ga

H. Detz, M. Kriz, S.Lancaster, D. MacFarland, M. Schinnerl, T. Zederbauer, A.M. Andrews, W. Schrenk and G.Strasser

J. Vac. Sci. Technol. B 35, 011803 (2017).

FIB : TEM specimen preparation

Cross-sectional transmission electron microscopy of precisely selected regions from semiconductor devices

E.C.G. Kirk, D.A. Williams and H. Ahmed

Inst. Phys. Conf. Ser. 100, 501 (1989).

Cross-sectional TEM Specimen Preparation of Semiconductor Devices by Focused Ion Beam Etching

K. Park

Mat. Res. Soc. Proc. Vol. 199, 271 (1990).

Fabrication of Planar and Cross-sectional TEM Specimens Using a Focused Ion Beam

R.J. Young, E.C.G. Kirk, D.A. Williams, H. Ahmed

Mat. Res. Soc. Proc. Vol. 199, 205 (1990).

FIBXTEM - Focussed Ion Beam Milling for TEM Sample Preparation

D.P. Basile, R. Boylan, B. Baker, K. Hayes, D. Soza

Mat. Res. Soc. Proc. Vol. 254, 23 (1992).

Focused ion beam micromachining for transmission electron microscopy specimen preparation of semiconductor laser diodes

J. Szot, R. Hornsey, T. Ohnishi and A. Minagawa

J. Vac. Sci. Technol. B 10, 575 (1992).

Application of the Focused Ion Beam Technique for Preparing the Cross-sectional Sample of Chemical Vapor Deposition Diamond Thin Film for High Resolution Transmission Electron Microscope Observation

M. Tarutani, Y. Takai, R. Shimizu

J. Vac. Sci. Technol. B 31, L1305 (1992).

Transmission Electron Microscopy Specimen Preparation Technique Using Focused Ion Beam Fabrication : Application to GaAs Metal-Semiconductor Field Effect Transistors

A. Yamaguchi., M. Shibata, T. Hashinaga

J. Vac. Sci. Technol. B 11, 2016 (1993).

Localized Thinning of Semiconductor Nanostructures for Cross-Sectional Transmission Electron Microscopy

C. Vieu, A. Pepin, G.B. Assayag, J. Gierak, F.R. Ladan

Inst. Phys. Conf. Ser. 134, 385 (1993).

Localized Thinning of GaAs/GaAlAs Nanostructures by a Combined Scanning Electron Micrograph/Focus Ion Beam System for High-Quality Cross-Sectional Transmission Electron Microscopy Samples

G. Ben Assayag, C. Vieu, J. Gierak, H. Chaabane, A. Pepin, P. Henoc

J. Vac. Sci. Technol. B 11, 531 (1993).

Layer structure evaluation of multilayer x-ray mirror by combination of focused ion beam etching and transmission electron microscopy

K. Nakajima, S. Sudo, M. Yakushiji, T. Ishii, S. Aoki
J. Vac. Sci. Technol. B 11, 2127 (1993).

Novel scheme for the preparation of transmission electron microscopy specimens with a focused ion beam

M.H.F. Overwijk, F.C. van den Heuvel and C.W.T. Bulle-Lieuwma
J. Vac. Sci. Technol. B 11, 2021 (1993).

Microscopic Studies of Semiconductor Lasers Utilizing a Combination of Transmission Electron Microscopy, Electroluminescence imaging, and Focused Ion Beam Sputtering

R. Hull, D. Bahnck, F.A. Stevie, L.A. Koszi and S.N.G. Chu
Appl. Phys. Lett. 62, 3408 (1993).

New Techniques for the Study of Degradation Modes in Semiconductor Lasers Using a Combination of TEM, Focused Ion Beam Sputtering and Electroluminescence Imaging

R. Hull, D. Bahnck, F.A. Stevie, L.R. Harriot, L. Koszi, S.N.G. Chu, C. Snyder
Inst. Phys. Conf. Ser. 134, 259 (1993).

Fabrication of Cross-sectional TEM Specimens of Metallic Materials Using a Focused Ion Beam. HREM of Interfaces in a Hot Dip Galvanized Steel

H. Saka, K. Kuroda, M.H. Hong, T. Kamino, T. Yaguchi, H. Tsuboi, T. Ishitani, H. Koike, A. Shibuya, Y. Adachi
in : Proceedings 13th Int. Conf. Electron Microscopy (ICEM13), pp. 1009-1010 (1994).

Application of Precision Cross-Section TEM to Failure Analysis of 0.5 um Devices

H. Zhang, G. Lindberg, S. Prasad, D. Li, F. Chen
in : Proc. 20th International Symposium for Testing and Failure Analysis (ISTFA 94), (ASM International, Materials Park, Ohio) pp. 71-71 (1994).

Advanced CMOS Silicon Technology Analysis Using Focused Ion Beam Etching and Transmission Electron Microscopy Observation

R. Pantel, G. Auvert, G. Mascarin, J.P. Gonchond
in : Proceedings 13th Int. Conf. Electron Microscopy (ICEM13), pp. 1007-1008 (1994).

Transmission Electron Microscope Sample Preparation Using a Focused Ion Beam

T. Ishitani, H. Tsuboi, T. Yaguchi, H. Koike
J. Electron Microsc. 43, 322 (1994).

Low-damage specimen preparation technique for transmission electron microscopy using iodine gas-assisted focused ion beam milling

A. Yamaguchi and T. Nishikawa
J. Vac. Sci. Technol. B 13, 962 (1995).

TEM Sample Preparation Using FIB : Practical Problems and Artifacts

A.J. Leslie, K.L. Pey, K.S. Sim, M.T.F. Beh, G.P. Goh
in : Proc. 21st International Symposium for Testing and Failure Analysis (ISTFA 95), (ASM International, Materials Park, Ohio) pp. 353-362 (1995).

Combining Transmission Electron Microscopy with Focused Ion Beam Sputtering for Microstructural Investigations of AlGaAs/GaAs Heterojunction Bipolar Transistors

C.W. Snyder, M.R. Frei, D. Bahnck, L. Hopkins, R. Hull, L. Harriott, T.Y. Chiu, T. Followan, B. Tseng
J. Vac. Sci. Technol. B 13, 1514 (1995).

Focused Ion Beam Sample Preparation for TEM

J.F. Walker, J.C. Reiner, C. Solenthaler
Inst. Phys. Conf. Ser. 146, 629 (1995).

TEM Sample Preparation Using a Focused Ion Beam and a Probe Manipulator

L.R. Herlinger, S. Chevacharoenkul, D.C. Erwin

in : Proc. 22nd International Symposium for Testing and Failure Analysis (ISTFA 96), (ASM International, Materials Park, Ohio) pp. 199-205 (1996).

Radiation Effects of Focused Ion Beam Microfabrication on Ni disilicide Thin Films by in situ Transmission Electron Microscopy

M. Tanaka, K. Furuya, T. Saito

Appl. Phys. Lett. 68, 961 (1996).

Cross-sectional Specimen Preparation of Fragile Failure Location in Thin-Film Transistors Using Focused Ion Beam Etching and Transmission Electron Microscope

N. Miura, K. Tsujimoto, R. Kanehara, N. Tsutsui, S. Tsuji

in : Proc. 22nd International Symposium for Testing and Failure Analysis (ISTFA 96), (ASM International, Materials Park, Ohio) pp. 95-100 (1996).

Cross-sectional Sample Preparation by Focused Ion Beam : A Review of Ion-Sample Interaction

T. Ishitani, T. Yaguchi

Microsc. Res. Tech. 35, 320 (1996).

Comparison Precison XTEM Specimen Preparation Techniques for Semiconductor Failure Analysis

C.A. Hunt

in : Proc. 23rd International Symposium for Testing and Failure Analysis (ISTFA 97), (ASM International, Materials Park, Ohio) pp. 97-101 (1997).

A Detailed Procedure for Reliable Preparation of TEM Samples Using FIB Milling

D.H.I. Su, H.T. Shishido, F. Tsai, L. Liang, F.C. Mercado

Mat. Res. Soc. Proc. Vol. 480, 105 (1997).

Evaluation of a New Strategy for Transverse TEM Specimen Preparation by Focused-Ion-Beam Thinning

F. Shaapur, T. Stark, T. Woodward and R.J. Graham

Mat. Res. Soc. Proc. Vol. 480, 173 (1997).

High Resolution Structure Imaging of Octahedral Void Defects in As-Grown Czochralski Silicon

H. Bender, J. Vanhellemont and R. Schmolke

Jpn. J. Appl. Phys. 36, L1217 (1997).

Cross-sectional Transmission Electron Microscopy and Focused Ion Beam Study of Advanced Silicon Devices

H. Bender, P. Roussel

Inst. Phys. Conf. Ser. 157, 465 (1997).

Preparing TEM Sections by FIB : Stress Relief to Straighten Warping Membranes

J.F. Walker

Inst. Phys. Conf. Ser. 157, 469 (1997).

Surface Damage of Semiconductor TEM Samples Prepared by Focused Ion Beams

J.F. Walker, R.F. Broom

Inst. Phys. Conf. Ser. 157, 473 (1997).

Transmission Electron Microscopy (TEM) Specimen Preparation Technique using Focused Ion Beam (FIB) : Application to Material Characterization of Chemical Vapor Deposition of Tungsten (W) and Tungsten

K. Doong, J.M. Fu, Y.C. Huang

in : Proc. 23rd International Symposium for Testing and Failure Analysis (ISTFA 97), (ASM International, Materials Park, Ohio) pp. 237-242 (1997).

Cross-sectional TEM Sample Preparation Method Using FIB Etching for Thin-Film Transistor

K. Tsujimoto, S. Tsuji, H. Takatsuji, K. Kuroda, H. Saka, N. Miura

Mat. Res. Soc. Proc. Vol. 480, 207 (1997).

Focused Ion Beam Milling and Micromanipulation Lift-Out for Site Specific Cross-section TEM Specimen Preparation

L.A. Giannuzzi, J.L. Drown, S.R. Brown, R.B. Irwin and F.A. Stevie
Mat. Res. Soc. Proc. Vol. 480, 19 (1997).

Minimizing Radiation Damage in Silicon Structured with Low Energy Focused Ion Beams

P.W. Nebiker, M. Döbeli, R. Mühle and M. Suter
Nucl. Inst. Methods Phys. B 127/28, 897 (1997).

Combined Tripod Polishing and FIB Method for Preparing Semiconductor Plan View Specimens

R. Anderson, S.J. Klepeis
Mat. Res. Soc. Proc. Vol. 480, 187 (1997).

Focused ion beam sample preparation, transmission electron microscopy and electron energy loss spectroscopy analysis of advanced CMOS silicon technology interconnections

R. Pantel, G. Auvert and G. Mascarin
Microelectron Eng. 37/38, 49 (1997).

Precision Transmission Electron Microscopy Sample Preparation Using a Focused Ion Beam by Extraction Method

T.T. Sheng, G.P. Goh, C.H. Tung and L.F. Wang
J. Vac. Sci. Technol. B 15, 610 (1997).

The Use of a Focused Ion Beam Machine to Prepare TEM Samples of Residual Phototresist

A. De Veirman and L. Weaver
in : , pp. - (1998).

The Challenge and Methods of TEM Cross-sectioning of <0.25 micron Plugs

C.A. Hunt, Y. Zhang and D. Su
Mat. Res. Soc. Proc. Vol. 523, 57 (1998).

Plan View TEM Sample Preparation Using the Focused Ion Beam Lift-Out Technique

F.A. Stevie, R.B. Irwin, T.L. Shofner, S.R. Brown, J.L. Drown and L.A. Giannuzzi
in : Proceedings NIST98, pp. - (1998).

Focused Ion Beam Preparation for Cross-Sectional Transmission Electron Microscopy Investigation of the Top Surface of Unpassivated or Partially Processed ULSI Devices

H. Bender, P. Van Marcke, C. Drijbooms and P. Roussel
in : Characterization and Metrology for ULSI Technology : 1998 International Conference, eds. D.G. Seiler, A.C. Diebold, W.M. Bullis, T.J. Shaffner, R. McDonald, al, (American Institute of Physics, Woodbury) pp. 863-867 (1998).

Transmission Electron Microscopy Observation of Thin Foil Specimens Prepared by Means of a Focused Ion Beam

H. Saka
J. Vac. Sci. Technol. B 16, 2522 (1998).

Microstructure of YBa₂Cu₃O₇-delta Josephson Junctions in Relation to Their Properties

K. Verbist, O.I. Lebedev, M.A.J. Verhoeven, R. Winchern, A.J.H.M. Rijnders, D.H.A. Blank, F. Tafuri, H. Bender and G. Van Tendeloo
Supercond. Sci. Technol. 11, 13 (1998).

Reduction of the Damage Induced in an FIB-Fabricated X-TEM Specimen

N.I. Kato, K. Tsujimoto, N. Miura
Mat. Res. Soc. Proc. Vol. 523, 39 (1998).

A plasma-polymerized protective film for transmission electron microscopy specimen preparation by focused ion beam etching

N.I. Kato, N. Miura and N. Tsutsui
J. Vac. Sci. Technol. A 16, 1127 (1998).

New Techniques for the Nanostructural Characterization of Semiconductor Materials and Devices using Combined Focused Ion Beam and Transmission Electron Microscopy Techniques

R. Hull, and D. Dunn

Mat. Res. Soc. Proc. Vol. 523, 141 (1998).

High-Yield and High-Throughput TEM Sample Preparation Using Focused Ion Beam Automation

R.J. Young, P.D. Carleson, X. Da, T. Hunt and J.F. Walker

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 329-336 (1998).

A Selected Area Planar TEM (SAPTEM) Sample Preparation Procedure for Failure Analysis of Integrated Circuits

S. Subramanian, P. Schani, E. Widener, P. Liston, J. Moss, V. Soorholtz

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 131-135 (1998).

Implanted Gallium-Ion Concentrations of Focused-Ion-Beam Prepared Cross Sections

T. Ishitani, H. Koike, T. Yaguchi and T. Kamino

J. Vac. Sci. Technol. B 16, 1907 (1998).

Proposals for Exact-Point Transmission-Electron Microscopy Using Focused Ion Beam Specimen Preparation Technique

T. Ishitani, Y. Taniguchi, S. Isakozawa, H. Koike, T. Yaguchi, H. Matsumoto and T. Kamino

J. Vac. Sci. Technol. B 16, 2532 (1998).

Detailed Investigation of SEM-results by TEM at one Sample Using FIB-Technique

U. Mühle, A. Wiesner, S. Schray

Microelectron. Reliab. 38, 895 (1998).

Applications and problems for TEM of semiconductor products

A.J. Mardingly

Inst. Phys. Conf. Ser. 164, 575 (1999).

Focused Ion Beam Preparation for Transmission Electron Microscopy Studies of ULSI Devices

H. Bender

Inst. Phys. Conf. Ser. 164, 593 (1999).

A New Focused-Ion-Beam Microsampling Technique for TEM Observation of Site-Specific Area's

T. Ohnishi, H. Koike, T. Ishitani, S. Tamimatsu, K. Umemura and T. Kamino

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 449-453 (1999).

Plane-view observation technique of silicon nanowires by transmission electron microscopy

T. Tsutsumi, E. Suzuki, K. Ishii, S. Kanemaru, T. Maeda and K. Tomizawa

J. Vac. Sci. Technol. B 17, 1897 (1999).

Automatic TEM Preparation

W.D. Kaplan, R. Oviedo, K. Kissinger, E.M. Raz and C. Smith

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 103-107 (1999).

Specific area planar and cross-sectional lift-out techniques : procedures and novel applications

R. Rai, S. Subramanian, S. Rose, J. Conner, Ph. Schani and J. Moss

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 415-421 (2000).

Focused ion beam control of sample cleaving for high resolution microscopy

R.M. Langford, C.M. Reeves, J.F. Findlay, C.E. Jeffree, J.G. Goodall

Inst. Phys. Conf. Ser. 164, 607 (2000).

Planar TEM analysis of nanoindented samples using the focused ion beam lift-out technique
T.L. Shofner, J.L. Drown, S.R. Brown, B.B. Rossie, M.A. Decker, Y.S. Obeng and F.A. Stevie
in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 459-461 (2000).

Surface damage formation during ion-beam thinning of samples for transmission electron microscopy
J.P. McCaffrey, M.W. Phaneuf, L.D. Madsen
Ultramicroscopy 87, 97 (2001).

Automated SEM and TEM sample preparation applied to copper/low k materials
R. Reyes, F. Shaapur, D. Griffiths, A.C. Diebold and B. Foran
AIP Conference Proc. CP550, 580 (2001).

Broad ion beam miling of focused ion beam prepared transmission electron microscopy cross sections for high resolution electron microscopy
R.M. Langford and A.K. Petford-Long
J. Vac. Sci. Technol. A 19, 982 (2001).

A comparison of EDS microanalysis in FIB-prepared and electropolished TEM thin foils
C.R. Hutchinson, R.E. Hackenberg and G.J. Shiflet
Ultramicroscopy 94, 37 (2003).

Novel FIB-TEM preparation methods for semiconductor device characterisation and failure analysis
D.M. Donnet, A.E.M. De Veirman, B. Otterloo, H. Roberts
Inst. Phys. Conf. Ser. 180, 617 (2003).

Artefacts in germanium transmission electron microscope specimens prepared by focused ion beam milling
P.R. Munroe, S. Rubanov
Inst. Phys. Conf. Ser. 180, 621 (2003).

A review of focused ion beam technology and its applications in transmission electron microscopy
M. Sugiyama, G. Sigetsu
J. Electron Microsc. 53, 527 (2004).

Reducing focused ion beam damage to transmission electron microscopy samples
N. Kato
J. Electron Microsc. 53, 451 (2004).

FIB-induced damage in silicon
S. Rubanov, P.R. Munroe
J. Microsc. 214, 213 (2004).

A study of the damage on FIB-prepared TEM samples of Al_xGa_{1-x}As.
Y. Yabuuchi, S. Tametou, T. Okano, S. Inazato, S. Sadayama, Y. Yamamoto, K. Iwasaki, Y. Sugiyama
J. Electron Microsc. 53, 471 (2004).

Combining Ar ion milling with FIB lift-out techniques to prepare high quality site-specific TEM samples
Z. Huang
J. Microsc. 215, 219 (2004).

A Three Beam Approach to TEM Preparation Using In-Situ Low Voltage Argon Ion Final Milling in A FIB-SEM Instrument
E.L. Principe, P. Gnauck, P. Hoffrogge
Microsc. Microanal. 11, 830 (2005).

Sample preparation for nanoanalytical electron microscopy using the FIB lift-out method and low energy ion milling
J. Scott, F.T. Docherty, M. MacKenzie, W. Smith, B. Miller, C.L. Collins and A.J. Craven
J. Phys. Conf. Ser. 26, 223 (2006).

Removing focused ion-beam damages on transmission electron microscopy specimens by using a plasma cleaner

S. Hata, H. Sosiati, N. Kuwano, M. Itakura, T. Nakano and Y. Umakoshi
J. Electron Microsc. 55, 23 (2006).

Bottom-up sample preparation technique for interfacial characterization of vertically aligned carbon nanofibers

Y. Ominamia, Q. Ngoa, P.N. Kobayashia, K. Mcilwrath, K. Jarausch, A. M. Cassell, J. Li, C.Y. Yang
Ultramicroscopy 106, 597 (2006).

Effective removal of Ga residue from focused ion beam using a plasma cleaner

D.-S. Ko, Y. Min Park, S.-D. Kim, Y.-W. Kim
Ultramicroscopy 107, 368 (2007).

Optimized FIB silicon samples suitable for lattice parameters measurements by convergent beam electron diffraction

L. Alexandre, K. Rousseau, C. Alfonso, W. Saikaly, L. Fares, C. Grosjean, A. Charaï
Micron 39, 294 (2008).

In-line FIB TEM sample preparation induced effects on advanced fully depleted silicon on insulator transistors

V. Delaye, F. Andrieu, F. Aussenac and C. Carabasse
in : Proceeding Electron Microscopy Conference, EMC 2008, eds. M. Luysberg, K. Tillmann, T. Weirich, (Springer, Berlin) pp. 659-660 (2008).

In-line transmission electron microscopy for micro and nanotechnologies research and development

V. Delaye, F. Andrieu, F. Aussenac, O. Faynot, R. Truche, C. Carabasse, A.L. Foucher, A. Daniel and A. Chabli-Brenac
Microelectron Eng. 85, 1157 (2008).

Transmission electron microscopy specimen preparation perpendicular to the long axis of high aspect ratio features

R.B. Irwin, A. Anciso, P.J. Jones, A.L. Glenn, B.L. Williams, S. Sridhar and S. Arshad
J. Vac. Sci. Technol. A 27, 1352 (2009).

High volume and fast turnaround automated inline TEM sample preparation for manufacturing process monitoring

H. Kang, J.F. King, O.D. Patterson, S.B. Herschbein, J.P. Nadeau and S.E. Fuller
in : Proc. 36th International Symposium for Testing and Failure Analysis (ISTFA 2010), (ASM International, Materials Park, Ohio) pp. 102-107 (2010).

Multiple Double XTEM Sample Preparation of Sub-10 nm Diameter Si Nanowires

L.M. Gignac, S. Mittal, S. Bangsaruntip, G.M. Cohen, J.W. Sleight
Microsc. Microanal. 16, 168 (2010).

Sample preparation for atomic-resolution STEM at low voltages by FIB

M. Schaffer, B. Schaffer, Q. Ramasse
Ultramicroscopy 114, 62 (2012).

A Method for Producing Site-Specific TEM Specimens from Low Contrast Materials with Nanometer Precision

H. Pettersson, S. Nik, J. Weidow, E. Olsson
Microsc. Microanal. 19, 73 (2013).

High-Volume Process Monitoring of FEOL 22nm FinFET Structures Using an Automated STEM

O. Ugurlu, M. Strauss, G. Dutrow, J. Blackwood, B. Routh, C. Senowitz, P. Plachinda, R. Alvis
SPIE 8681, 868107 (2013).

Local thickness and composition analysis of TEM lamellas in the FIB

C. Lang, M. Hiscock, M. Dawson, C. Hartfield

Microelectron. Reliab. 54, 1790 (2014).

Convenient Preparation of High-Quality Specimens for Annealing Experiments in the Transmission Electron Microscope

M. Duchamp, Q. Xu, R.E Dunin-Borkowski

Microsc. Microanal. 20, 1638 (2014).

Sample preparation by focused ion beam micromachining for transmission electron microscopy imaging in front-view

M. Jublot, M. Texier

Micron 56, 63 (2014).

Advanced FIB sample preparation techniques for high resolution TEM investigations of HEMT structures

M. Simon-Najasek, S. Huebner, F. Altmann, A. Graff

Microelectron. Reliab. 54, 1785 (2014).

Use of permanent marker to deposit a protection layer against FIB damage in TEM specimen preparation

Y.C. Park, B.C. Park, S. Romankov, K.J. Partk. J.H. Yoo, Y.B. Lee, J.-M. Yang

J. Microsc. 255, 180 (2014).

Focused high- and low-energy ion milling for TEM specimen preparation

A. Lotnyk, D. Poppitz, U. Ross, J.W. Gerlach, F. Frost, S. Bernütz, E. Thelander, B. Rauschenbach

Microelectron. Reliab. 55, 2119 (2015).

TEM sample preparation of a SEM cross section using electron beam induced deposition of carbon

E. Ricci, F. Cazzaniga, S. Testai

Microelectron. Reliab. 55, 2126 (2015).

Post-ion beam induced degradation of copper layers in transmission electron microscopy specimens

F. Seidel, O. Richard, H. Bender and W. Vandervorst

Semicond. Sci. Technol 30, 114016 (2015).

Examining Foil Sidewall Damage During TEM Sample Preparation Using Gallium FIB and Needle Geometries

M. Presley, D. Huber, H. Fraser

Microsc. Microanal. 21, 1411 (2015).

Silica–gold bilayer-based transfer of focused ion beam-fabricated nanostructures

X. Wu, P. Geisler, E. Krauss, R. Kullocka and B. Hecht

Nanoscale 7, 16427 (2015).

Plan-view sample preparation of a buried nanodots array by FIB with accurate EDS positioning in thickness direction

C. Zhong, L. Lin, R. Qi, Y. Cheng, X. Gao, R. Huang

Ultramicroscopy 207, 112840-1 (2019).

FIB : Atom probe preparation

Focused ion beam fabrication of field-ion microscope specimens from mechanically milled pearlitic steel powder

S. Ohsaki, K. Hono, H. Hidaka, S. Takaki.

J. Electron Microsc. 53, 523 (2004).

Application of focused ion beam to atom probe tomography specimen preparation from mechanically alloyed powders

P.P. Choi, T. Al-Kassab, Y.S. Kwon, J.S. Kim, R. Kirchheim

Microsc. Microanal. 13, 347 (2007).

Transmission electron microscopy and atom probe specimen preparation from mechanically alloyed powder using the focused ion-beam lift-out technique

P.P. Choi, Y.S. Kwon, J.S. Kim, T. Al-Kassab

J. Electron Microsc. 56, 43 (2007).

Specimen preparation for correlating transmission electron microscopy and atom probe tomography of meso scale features

M.I. Hartshorne, D. Isheim, D.N. Seidman, M.L. Taheri

Ultramicroscopy 147, 25 (2014).

Preparation and Analysis of Atom Probe Tips by Xenon Focused Ion Beam Milling

R. Estivill, G. Audoit, J.-P. Barnes, D. Blavette

Microsc. Microanal. 22, 576 (2016).

Preparation and Analysis of Atom Probe Tips by Xenon Focused Ion Beam Milling

R. Estivill, G. Audoit, J.-P. Barnes, A. Grenier and Didier Blavette

Microsc. Microanal. , 1 (2016).

FIB : Failure Analysis

An Application of Focused Ion Beams to Electron Beam Testing of Integrated Circuits

J. Puretz, J. Orloff, L. Swanson

SPIE 471, 38 (1984).

Integrated Circuit Diagnosis Using Focused Ion Beams

D.C. Shaver and B.W. Ward

J. Vac. Sci. Technol. B 4, 185 (1986).

Applications of Focused Ion Beam Technique to Failure Analysis and Process Monitoring of VLSI

K. Nikawa, N. Nasu, M. Murase, T. Kaito, T. Adachi, and S. Inoue

in : Proc. International Reliability Physics Symposium, (IEEE,) pp. 43-52 (1989).

Case History : Failure Analysis of a CMOS SRAM with an Intermittent Open Contact

A.N. Campbell, E.I. Cole, C.L. Henderson, M.R. Taylor

in : Proc. 17th International Symposium for Testing and Failure Analysis (ISTFA 91), (ASM International, Materials Park, Ohio) pp. 261-269 (1991).

Imaging Dielectric Breakdown in MOS Transistors Using a Combination Transmission Electron Microscope and Focused Ion Beam

H. Mendez, S. Morris, N. Dickson, S. Tatti, B. Vonada, T. Rector, R. Pyle, B. Schwiesow

in : Proc. 17th International Symposium for Testing and Failure Analysis (ISTFA 91), (ASM International, Materials Park, Ohio) pp. 429-435 (1991).

Application of Focused Ion Beam Technique to Failure Analysis of Very Large Scale Integrations

K. Nikawa

J. Vac. Sci. Technol. B 9, 2566 (1991).

VLSI Failure Analysis and Characterization Applications of Photon and Ion Beams

L.L. Hahn, M.T. Abramo, P.T. Coutu

in : Proc. 17th International Symposium for Testing and Failure Analysis (ISTFA 91), (ASM International, Materials Park, Ohio) pp. 1-5 (1991).

Integration of a Focused Ion Beam System in a Failure Analysis Environment

R.G. Lee, J.C. Morgan

in : Proc. 17th International Symposium for Testing and Failure Analysis (ISTFA 91), (ASM International, Materials Park, Ohio) pp. 85-95 (1991).

Advanced Micromachining Techniques for Failure Analysis

S.J. Kirch, D.J. Tomasi

in : Proc. 17th International Symposium for Testing and Failure Analysis (ISTFA 91), (ASM International, Materials Park, Ohio) pp. 35-39 (1991).

Focused Ion Beam Applications to Failure Analysis of Si Device Chip

K. Nikawa

IEICE Trans Fundam. Electron. Commun. E77, 174 (1994).

Electrical Biasing and Voltage Contrast Imaging in a Focused Ion Beam System

A.N. Campbell, J.M. Soden, J. Rife, R.G. Lee

in : Proc. 21st International Symposium for Testing and Failure Analysis (ISTFA 95), (ASM International, Materials Park, Ohio) pp. 33-41 (1995).

In-Line Defect Characterization Using Focused Ion Beam

L. Liu, N. Doan, P. Wang

in : Proc. 21st International Symposium for Testing and Failure Analysis (ISTFA 95), (ASM International, Materials Park, Ohio) pp. 231-234 (1995).

BiCMOS Die Sort Yield Improvement from Isolation of a Localized Defect Mechanism and Precision TEM Cross Section

J. Douglass, T.D. Myers, F. Tsai, R. Ketcheson, J. Erret

in : Proc. 23rd International Symposium for Testing and Failure Analysis (ISTFA 97), (ASM International, Materials Park, Ohio) pp. 321-328 (1997).

FIB for Failure Analysis

M. Abramo, R. Wasielewski

Semicond. International , 133 (1997).

The Application of FIB Voltage-Contrast Technique Combining with TEM on Subtle Defect Analysis : Via Delamination after TC

X. Yang, X. Song

in : Proc. 23rd International Symposium for Testing and Failure Analysis (ISTFA 97), (ASM International, Materials Park, Ohio) pp. 115-119 (1997).

Application of Layout Overlay for Failure Analysis

C. Burmer, S. Görlich and S. Pauthner

Microelectron. Reliab. 38, 987 (1998).

Layout Overlay Techniques to Improve Failure Analysis

C. Burmer, S. Görlich and S. Pauthner

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 365-372 (1998).

The Use of the Focused Ion Beam in Failure Analysis

D. Verkleij

Microelectron. Reliab. 38, 869 (1998).

Junction Delineation and EBIC on FIB Cross-Section

G. Perez, Courtade F., Benteo B., Gauffier J-L., Kwang J-L.

Microelectron. Reliab. 38, 907 (1998).

Induced Damages on CMOS and Bipolar Integrated Structures under Focused Ion Beam Irradiation

J. Benbrik, Perdu P., Benteo B., Desplats R., Labat N., Touboul A., Danto Y.

Microelectron. Reliab. 38, 901 (1998).

Analysis of Iddq Failures by Spectral Phonon Emission Microscopy

M. Rasras, I. De Wolf, H. Bender, G. Groeseneken, H.E. Maes, S. Vanhaeverbeke, P. De Pauw

Microelectron. Reliab. 38, 877 (1998).

A Method for Cross Sectioning Polyimide Passivated Semiconductors

R. Gatto

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 387-389 (1998).

Focused Ion Beam Induced Effects on MOS Transistor Parameters

A.N. Campbell, P. Tangyunyong, J.R. Jessing, C.E. Hembree, D.M. Fleetwood, S.E. Swanson, J.M. Soden, N. Antoniou, W.E. Vanderlinde, M.T. Abramo

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 273-281 (1999).

Die Backside FIB Preparation for Identification and Characterization of Metal Voids

A.N. Campbell, W.F. Filter and N. Antoniou

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 317-325 (1999).

Failure Analysis of Autoclave-Stressed SRAMs with Aluminum Fuses

J. Moss, S. Subramanian, C.M. Chan, V. Soorholtz, M. Thomas and M. Gerber

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 293-296 (1999).

Reliability Test Results for Pt FIB Interconnect Structures

M. Zaragoza

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 263-272 (1999).

Characterization and Fault Identification of Copper BEOL Sub 0.25 um Six Level Metal Microprocessor Designs

T. Kane, K. DeVries, M. Tenney and A. Patel

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 335-341 (1999).

Electromigration reliability of dual-damascene Cu/oxide interconnects

E.T. Ogawa, V.A. Blaschke, A. Bierwag, K-D Lee, H. Matsuhashi, D. Griffiths, A. Ramamurthi, P.R. Justicon, R.H. Havemann, P.S. Ho

Mat. Res. Soc. Proc. Vol. 612, D2.3.1 (2000).

A focused ion beam technique to electrically contact the deep trench capacitor of a single active memory cell in the sub 0.25 um technology regime

G. Zimmermann, M. Johnston and R. Christ

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 225-230 (2000).

New FIB-Supported Approach for Wirebond Characterization

P. Jacob and G. Nicoletti

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 35-40 (2000).

Electromigration characterization versus texture analysis in damascene copper interconnects

T. Berger, L. Arnaud, R. Gonella, I. Touet, G. Lormand

Mat. Res. Soc. Proc. Vol. 612, D2.4.1 (2000).

Silicon trenching using dry etch process for backside FIB and probing

V. Korchnoi, A. Fenigstein, A. Barger

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 559-565 (2000).

Application of Focused Ion Beam in Debug and Characterization of 0.13 um Copper Interconnect Technology

C. Yuan, M. Mahanpour, H-J. Lin, G. Hill

in : Proc. 28th International Symposium for Testing and Failure Analysis (ISTFA 2002), (ASM International, Materials Park, Ohio) pp. 183-188 (2002).

FIB : Circuit edit

The Focused Ion Beam as an Integrated Circuit Restructuring Tool

J. Melngailis, C.R. Musil, E.H. Stevens, M. Utlaut, E.M. Kellogg, R.T. Post, M.W. Geis and R.W. Mountain
J. Vac. Sci. Technol. B 4, 176 (1986).

Ingrated Circuit Repair Using Focused Ion Beam Milling

L.R. Harriot, A. Wagner and F. Fritz
J. Vac. Sci. Technol. B 4, 181 (1986).

How to Prepare Golden Devices Using Lesser Materials

K. Van Doorselaer, M. Van den Reeck, L. Van den Bempt, R. Young, J. Whitney
in : Proc. 19th International Symposium for Testing and Failure Analysis (ISTFA 93), (ASM International, Materials Park, Ohio) pp. 405-414 (1993).

Rapid Prototyping of Submicron ICs Using FIB

D. Perrin, W. Seifert
Solid State Technol. , (1994).

Design Guidelines for FIB Modifiability and a Case Study of a High Performance SCSI Chip with Timing Problems

S.X. Li, D. Lee and S. Leung
in : Proc. 20th International Symposium for Testing and Failure Analysis (ISTFA 94), (ASM International, Materials Park, Ohio) pp. 415-419 (1994).

Carbon Coating for Electron Beam Testing and Focus Ion Beam Reconfiguration

P. Perdu, G. Perez, M. Dupire and B. Benteo
in : Proc. 22nd International Symposium for Testing and Failure Analysis (ISTFA 96), (ASM International, Materials Park, Ohio) pp. 333-338 (1996).

Investigations of Leakage Paths in Sub-0.35 um DRAM Products Using Advanced Focused Ion Beam Techniques

H. Lorenz and C. Engel
in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 289-295 (1998).

Focused Ion Beam Irradiation Induced Damages on CMOS and Bipolar Technologies

J. Benbrik, G. Rolland, P. Perdu, B. Benteo, M. Casari, R. Desplats, N. Labat, A. Touboul and Y. Danto
in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 49-55 (1998).

In-Situ Electrical Monitoring and Contactless Measurement Techniques for Enhanced FIB Modifications

R. Desplats, J. Benbrik, P. Perdu, B. Benteo, F. Marc and Y. Danto
in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 119-125 (1998).

FIB Micro-Surgery on Flip-Chips From the Backside

R. Lee and N. Antoniou
in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 455-459 (1998).

The Challenges of FIB Chip Repair and Debug Assistance in the 0.25 um Copper Interconnect Millennium

S.B. Herschbein, L.S. Fischer, T.L. Kane, M.P. Tenney and A.D. Shore

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 127-130 (1998).

Focused Ion Beam Application in Solving RFIC Oscillation Problem

S.P. Zhao, H.N. Ma, S.J. Fang, G.P. Goh and J. Wang

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 73-76 (1998).

Performing Circuit Modification and Debugging Using Focused-Ion-Beam on Multi-Layered C4 Flip-Chip Devices

S.X. Li

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 67-72 (1998).

AC Hot-Carrier Effects Characterization by Circuit Modification Using Focused Ion Beam

Y. Yoo, C. Lee and J. Lee

in : Proc. 24th International Symposium for Testing and Failure Analysis (ISTFA 98), (ASM International, Materials Park, Ohio) pp. 57-66 (1998).

Integrated Circuit Device Repair using FIB system : Tips, Tricks, and Strategies

K.N. Hooghan, K.S. Wills, P.A. Rodriguez, S. O'Connell

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 247-254 (1999).

In-situ use of an Optical Microscope for FIB Microsurgery of Planarized Devices

P.J. Wolpert and R. Lee

in : Proc. 25th International Symposium for Testing and Failure Analysis (ISTFA 99), (ASM International, Materials Park, Ohio) pp. 127-133 (1999).

Automatic determination of optimal FIB operations for improved circuit probing and fast reconfiguration

R. Desplats, T. Dargnies, J-C. Courrege, P. Perdu, J-L. Noullet

in : Proc. 26th International Symposium for Testing and Failure Analysis (ISTFA2000), (ASM International, Materials Park, Ohio) pp. 407-414 (2000).

Electrical Characterization of Circuits with Low K Dielectric Films and Copper Interconnects

T. Kane, P. McGinnis and B. Engel

in : Proc. 27th International Symposium for Testing and Failure Analysis (ISTFA 2001), (ASM International, Materials Park, Ohio) pp. 1-7 (2001).

Circuit edit of superconducting microcircuits

M.J.Martinez-Perez, J.Sese, R.Cordoba, F.Luis, D.Drung, and T.Schurig

Supercond. Sci. Technol. 22, 125020 (2009).

Success! > 90% Yield for 65nm/40nm Full-thickness Backside Circuit Edit

D.W. Niles, R.W. Kee

in : Proceedings 36th International Symposium for Testing and Failure Analysis, ISTFA 2010, pp. 348-358 (2010).

Precise Nanofabrication with Multiple Ion Beams for Advanced Circuit Edit

H. Wu, D. Ferranti, L. Stern

Microelectron. Reliab. 54, 1779 (2014).

Using energy dispersive spectroscopy (EDS) to determine the resistance of FIB jumpers for circuit edit

M. DiBattista, C. Senowitz, H. Faraby and P. Bandaru

in : Proc. 40th International Symposium for Testing and Failure Analysis (ISTFA 2014), (ASM International, Materials Park, Ohio) pp. 287-292 (2014).

FIB : Chemical analysis

FIB Sample Preparation to Reduce Charging for Auger Analysis

K.V. Huffman, C.F. Hoener and B. Shaver

in : Proc. 20th International Symposium for Testing and Failure Analysis (ISTFA 94), (ASM International, Materials Park, Ohio) pp. 365-375 (1994).

Auger Analysis of Etch Residues in Submicrometer Via Holes using Focused Ion Beam Sample Preparation

C.F. Hoener, Shaver B. and Nguyen T.T.

Surf. Interface Anal. 23, 83 (1995).

Behaviour of Gallium Secondary Ion Intensity in Gallium Focused Ion Beam Secondary Ion Mass Spectrometry

T. Sakamoto, M. Owari, Y. Nihei

Jpn. J. Appl. Phys. 36, 1287 (1997).

High sensitivity FIB-SIMS analysis of semiconductor devices

M. Hughes, D.S. McPhail, R.J. Chater and J. Walker

Inst. Phys. Conf. Ser. 164, 603 (2000).

FIB : Bio-applications

Demonstration of a focused ion-beam cross-sectioning technique for ultrastructural examination of resin-dentin interfaces

B. Van Meerbeek, L.J. Conn, E.S. Duke, D. Schraub and F. Ghafghaichi

Dent. Mater. 11, 87 (1995).

Ultrastructural examination of dentin using focused ion-beam cross-sectioning and transmission electron microscopy

R.K. Nalla, A.E. Porter, C. Daraio, A.M. Minor, V. Radmilovic, E.A. Stach, A.P. Tomsia and R.O. Ritchie

Micron 36, 672 (2005).

Surface damage induced by FIB milling and imaging of biological samples is controllable.

D. Drobne, M. Milani, V. Leser, F. Tatti.

Microsc. Res. Tech. 70, 895 (2007).

Site-specific, cross-sectional imaging of biomaterials and the cell/biomaterial interface using focused ion beam/scanning electron microscopy

H.K. Edwards, S.C. Coe, M.W. Fay, C.A. Scotchford, D.M. Grant and P.D. Brown

J. Phys. Conf. Ser. 126, 012097 (2008).

The use of dual beam ESEM FIB to reveal the internal ultrastructure of hydroxyapatite nanoparticle-sugar-glass composites

D.M. Wright, J.J. Rickard, N.H. Kyle, T.G. Gard., H. Dobberstein, M. Motzkin, A.M. Donald, J.N. Skepper

J. Mater. Sci.: Mater. Med. 20, 203 (2009).

Ultrastructural characterization of tooth-biomaterial interfaces prepared with broad and focused ion beams

E. Coutinho, T. Jarman, F. Svahn, A.A. Neves, B. Verlinden, B. Van Meerbeek and H. Engqvist

Dent. Mater. 25, 1325 (2009).

Characterization of dentine structure in three dimensions using FIB-SEM

J.S. Earl, R.K. Leary, J.S. Perrin, R. Brydson, J.P. Harrington, K. Markowitz and S.J. Milne

J. Microsc. 240, 1 (2010).

Focused ion beam micromachining of eukaryotic cells for cryoelectron tomography

A. Rigort, F.J.B. Bäuerlein, E. Villa, M. Eibauer, T. Laugks, W. Baumeister and J.M. Plitzko

PNAS 109, 4449 (2012).

Focused ion beams in biology

K. Narayan and S. Subramaniam

Nature Meth. 12, 1021 (2015).