

VITA AND BIOGRAPHICAL DATA SHEET

James L. Marshall Chemistry
 University of North Texas
 Denton TX 76201

120 Cobblestone Row
Denton TX

EDUCATION:

1962 B.S. chemistry Indiana University, Bloomington IN
1966 Ph.D. organic chemistry Ohio State University, Columbus OH
1987-current Professor UNT Denton Texas
1982-1987 Head of Manufacturing Technology, Motorola, Ft. Worth, TX
1981-1982 Head of Analytical Division, Celanese Corporation, Corpus Christi TX
1975-1981 Professor UNT Denton TX
1970-1974 Associate Professor UNT Denton TX
1967-1969 Assistant Professor UNT Denton TX
1966-1967 Postdoctoral Fellow University of Colorado, Boulder CO

PROFESSIONAL ACTIVITIES

Membership: American Chemical Society, Sigma Xi, Alpha Chi Sigma
Chair of DFW Section of the American Chemical Society
Cofounded North Texas Materials Characterization Society
Elected Fellow of the American Chemical Society, Special Awards Ceremony at the National ACS Meeting, Denver CO, Aug 29, 2011 (at the end of 2011, there were a total of only 568 Fellows in the entire American Chemical Society)

Honors: Outstanding Award, 2004, Historical Division, American Chemical Society
Awarded Honors Professor, "Top Prof," and EM+ Outstanding Faculty Member at UNT
American Chemical Society Lecture Speaker, 1995-present
Managing Editor, The Southwest Retort, American Chemical Society Publication covering five states

DEPARTMENT/DIVISION COMMITTEES

Chairman, Departmental Services, Department of Chemistry, UNT, 1070-1977
Administrative Chairman of Materials Science Program, 1989-1992
Director of Center for Materials Characterization, 1989-1992
Director of Industry-University Cooperative Research Center, 1989-1992
Chairman, Department of Chemistry, 1991-1993
Executive Committee, Department of Chemistry, UNT, 1970-1981
Undergraduate Affairs Committee, Department of Chemistry, UNT, 1970-1974, 1990-present
Building Committee, Department of Chemistry, UNT, 2002-present

Safety Officer, Department of Chemistry, UNT, 2005-present

GRANTS AND CONTRACTS

PRF Starter Grant, 1968-70, \$3,000
Research Corporation, 1969-73, \$5,000
Robert A. Welch Foundation, 1969-72, \$36,000
Robert A. Welch Foundation, 1972-75, \$36,000
Robert A. Welch Foundation, 1975-78, \$51,000
Robert A. Welch Foundation, 1978-81, \$51,000
National Science Foundation Departmental Equipment Grant, 1970-72, \$11,000
National Science Foundation Departmental Capital Equipment Grant (FT-NMR), 1976, \$35,000
University of North Texas Faculty Research, 1967-80, \$57,000
Texas Energy Research Program, \$280,000, in association with the Texas Utilities Electric of Dallas and International Digital Modeling of Austin, 1989-1993
Motorola Research Grant, 1989-1991, \$15,000
Motorola Partnerships in Research, 1989-1992, \$60,000
National Science Foundation, Industry-University Research Cooperative Research Program, starter grant, 1989, \$10,000
National Science Foundation, Industry-University Research Cooperative Research Program, 1990-1995, \$250,000
Harry Diamond U.S. Strategic Materials Center, Electronic Intermetallics, \$16,000
Harry Diamond U.S. Strategic Materials Center, Composite Solders, \$105,000
Harry Diamond U.S. Strategic Materials Center, Composite Solders, \$50,000
Harry Diamond U.S. Strategic Materials Center, Sequential Electrochemical Reductive Analysis, \$50,000
Motorola Capital Equipment Grant, \$100,900
IUCRC, Electronic Materials, \$30,000
SERA (Sequential Electrochemical Reductive Analysis) contracts, \$100,000
Texas Instruments, Metrology and Advanced Characterization, \$18,000, 1998-99
The Mystery of Matter: Search for the Elements, Moreno/Lyons Productions LLC, Advisory Board, NSF Proposal granted for \$2.78 million, In association with the International Year of Chemistry, Projected 2011 airing date, Steve Lyons, project director

PROFESSIONAL PRESENTATIONS.

It is impossible to list the estimated several hundred presentations during the work of J. L. Marshall, which expand the period from 1964 for over 50 years and cover the career through academia and industry. Instead, *as representative examples*, let the following list of *invited American Chemical Society Tour Presentations* suffice:

September 21, 1995 — Lawton, OK
September 22, 1995 — Kilgore, TX
September 23, 1995 — Longview, TX
September 23, 1995 — Shreveport, LA
September 24, 1995 — Monroe, LA
September 25, 1995 — Conway, AR
October 6, 1995 — Greenville, NC
November 6, 1995 — Ada, OH

November 7, 1995 — Charleston, WV
November 7, 1995 — Nitro, WV
November 8, 1995 — Athens, OH
November 9, 1995 — Huntington, WV
January 29, 1996 — Searcy, AR
March 19, 1996 — Ponca City, OK
March 20, 1996 — Tulsa, OK
March 21, 1996 — Weatherford, OK
October 22, 1996 — Manhattan, KS
October 23, 1996 — Salina, KS
October 24, 1996 — Kansas City, KS
October 25, 1996 — Pittsburgh, KS
November 16, 1996 — Kingsville, TX
April 10, 1997 — Abilene, TX
November 11, 1997 — Moline, IL
November 12, 1997 — Peoria, IL
February 27, 1998 — Wichita Falls, TX
September 15, 1998 — Houston, TX
September 16, 1998 — Freeport, TX
September 17, 1998 — Victoria, TX
September 18, 1998 — Corpus Christi, TX
December 3, 1998 — Cedar Falls, IA
February 21, 2000 — Athens, GA
February 22, 2000 — Spartanburg, SC
February 23, 2000 — Charlotte, NC
February 24, 2000 — Hartsville, SC
February 28, 2000 — Aiken, SC
April 3, 2000 — Cape Girardeau, MO
April 4, 2000 — Rolla, MO
April 5, 2000 — Springfield, IL
April 6, 2000 — Jefferson City, MO
April 20, 2000 — Huntington, WV
November 16, 2000 — Duncan, OK
May 7, 2001 — San Antonio, TX
November 8, 2001 — Durant, OK
March 8, 2002 — Edmond, OK
April 11, 2002 — Longview, TX
October 17, 2003 — Durham, NH
March 11, 2004 — Oak Ridge, Tennessee
September 30, 2005 — Shawnee OK
October 10, 2005 — Waco TX
October 11, 2005 — San Angelo TX
October 12, 2005 — Lubbock TX
October 13, 2005 — Amarillo TX
April 3-5, 2006 — New Haven CT
October 4, 2006 — Durham NH
October 6, 2006 — Middlebury VT
October 27, 2006 — Fort Worth TX
February 21, 2006 — Longview TX

November 3, 2008 – Mobile AL
November 4, 2008 – New Orleans LA
November 5, 2008 – Baton Rouge LA
November 6, 2008 – Lake Charles LA
April 13, 2009 – Midland TX
April 14, 2009 – Austin TX
September 19, 2010 – Huntington WV
September 20, 2010 – Huntington WV
October 6, 2011 – San Angelo TX
October 19, 2011 – Tucson AZ
October 20, 2011 – Scottsdale AZ
October 21, 2011 – Las Vegas NV
April 20, 2013 – Sacramento CA
May 2, 2013 – Davenport IA
September 16, 2013 – Wichita KS
September 17, 2013 – Manhattan KS
September 18, 2013 – Pittsburg KS
September 19, 2013 – Bartles OK
September 20, 2013 – Shawnee OK
November 14, 2013 – Norman OK
November 15, 2013 – Norman OK
April 10, 2014 – Carthage TX

PUBLICATIONS:

1. "The Solvolysis of 7-Ketonorbonyl Tosylates," P. G. Gassman and J. L. Marshall, *J. Amer. Chem. Soc.*, **87**, 4648 (1965).
2. "A Classical Norbornyl Cation," P. G. Gassman and J. L. Marshall, *Tetrahedron Letters*, No. 46, 4073 (1965).
3. "Carbonyl Neighboring Group Participation via Enolization," P. G. Gassman and J. L. Marshall, *J. Amer. Chem. Soc.*, **88**, 2599 (1966).
4. "The Synthesis and Solvolysis of 7-Ketonorbonyl Tosylates," P. G. Gassman and J. L. Marshall, *J. Amer. Chem. Soc.*, **88**, 2822 (1966).
5. "Acetolysis of 7,7-Dimethoxybicyclo[2.2.1]heptan-exo-2-ol p-Toluenesulfonate," P. G. Gassman and J. L. Marshall, *Tetrahedron Letters*, No. 20, 2433 (1968).
6. "MeO-4 Participation in Solvolysis Reactions," P. G. Gassman and J. L. Marshall, *Tetrahedron Letters*, No. 20, 2429 (1968).
7. "Cis- and trans-Bicyclo[6.1.0]nonan-2-one," C. H. DePuy and J. L. Marshall, *J. Org. Chem.*, **33**, 3326 (1968).
8. "The 7-Norbornyl Cation — Nonclassical or Nonplanar?" P. G. Gassman, J. Hornback, and J. L. Marshall, *J. Amer. Chem. Soc.*, **90**, 6238 (1968).
9. "Substituent Effects on the Acetolysis of exo- and endo-2-Norbornyl Tosylates," P. G. Gassman, J. L.

- Marshall, J. G. Macmillan, and J. M. Hornback, *J. Amer. Chem. Soc.*, **91**, 4282 (1968).
10. "Bicyclo[2.2.1]heptan-7-one," P. G. Gassman and J. L. Marshall, *Organic Syntheses*, Vol. **48**, 25 (1968).
 11. "7,7-Dimethoxybicyclo[2.2.1]heptane," P. G. Gassman and J. L. Marshall, *Organic Syntheses*, Vol. **48**, 68 (1968).
 12. "Keto Tosylates. I. Monotosylation of cis-3-(2-Hydroxyethyl)cyclopentanol," J. L. Marshall, J. P. Brooks, and G. W. Hatzenbuehler, III, *J. Org. Chem.*, **34**, 4192 (1969).
 13. "The Synthesis and Acetolysis of the Epimeric 7-Tosyloxy-norbornan-2-ones," P. G. Gassman, J. L. Marshall, and J. M. Hornback, *J. Amer. Chem. Soc.*, **91**, 5811 (1969).
 14. "Long Range Splitting in the NMR Spectrum of 1,4-Dihydrobenzoic Acid," J. L. Marshall, K. C. Erickson, and T. K. Folsom, *J. Org. Chem.*, **35**, 2038 (1970).
 15. "The Esterification of Carboxylic Acids Using a Boron Trifluoride-Etherate-Alcohol Reagent," J. L. Marshall, K. C. Erickson, and T. K. Folsom, *Tetrahedron Letters*, No. 46, 4011 (1970).
 16. "The Reactions of 3-(2-Tosyloxyethyl)cyclopentanone," J. L. Marshall, *Tetrahedron Letters*, No. 10, 753 (1971).
 17. "The Birch Reduction of [2.2]Paracyclophane," J. L. Marshall and T. K. Folsom, *Tetrahedron Letters*, No. 10, 757 (1971).
 18. "The Conformation of 1,4-Dihydro-1-naphthoic Acid from the Nuclear Magnetic Resonance Spectrum," J. L. Marshall and T. K. Folsom, *J. Org. Chem.*, **36**, 2011 (1971).
 19. "Carbon Magnetic Resonance Studies of Enriched Compounds. Carbon-13-Carbon-13 Coupling Constants of 13-C-7 Labeled Monosubstituted Benzene Derivatives," A. M. Ihrig and J. L. Marshall, *J. Amer. Chem. Soc.*, **94**, 1756 (1972).
 20. "The Proton Magnetic Resonance Spectrum of 13-C-7 Methyl Benzoate," A. M. Ihrig and J. L. Marshall, *J. Amer. Chem. Soc.*, **94**, 3268 (1972).
 21. "Long-Range Carbon-Carbon Coupling Constants in Enriched Compounds," J. L. Marshall and A. M. Ihrig, *Tetrahedron Letters*, No. 21, 2139 (1972).
 22. "The Conformation of 1,4-Dihydro-1-naphthoic Acid. II. The Nuclear Magnetic Resonance Spectrum of the Heptadeuterio Analog," J. L. Marshall, A. M. Ihrig, and P. N. Jenkins, *J. Org. Chem.*, **37**, 1863 (1972).
 23. "Long-Range Carbon-Carbon Coupling Constants from 1-13C-Labeled Toluene," J. L. Marshall, A. M. Ihrig, and D. E. Miiller, *J. Mol. Spectrosc.*, **43**, 323 (1972).
 24. "Solvolytic Behavior of 7,7-Dimethoxybicyclo[2.2.1]hept-2-yl Tosylates," P. G. Gassman, J. L. Marshall, and J. G. Macmillan, *J. Amer. Chem. Soc.*, **95**, 6319 (1973).
 25. "Carbon-13-Carbon-13 Coupling Constants of 13C-Methyl Labeled o- and p-Substituted Toluenes," J. L. Marshall and A. M. Ihrig, *Organic Magnetic Resonance*, **5**, 235 (1973).

26. "The Angular Dependence of Three-Bonded Carbon-Carbon Coupling Constants," J. L. Marshall and D. E. Miiller, *J. Amer. Chem. Soc.*, **95**, 8305 (1973).
27. "Scrambling of the 1-Carbon During the Catalytic Dehydrogenation of 1-Methylcyclohexene," J. L. Marshall, D. E. Miiller, and A. M. Ihrig, *Tetrahedron Letters*, No. 36, 3491 (1973).
28. "The Stereochemical Elucidation of the Birch Reduction Product of [2.2]-Paracyclophane," J. L. Marshall and B.-H. Song, *J. Org. Chem.*, **39**, 1342 (1974).
29. "Long-Range Carbon-Carbon Coupling in Olefins. 4-¹³C-4-Propyl-3-heptene and 1-¹³C-1-Methylcyclohexene," J. L. Marshall and D. E. Miiller, *Organic Magnetic Resonance*, **6**, 395 (1974).
30. "Long-Range Carbon-Proton Spin-Spin Coupling in Carboxyl-Labeled Crotonic and Isocrotonic Acids," J. L. Marshall and R. Seiwel, *J. Magnetic Resonance*, **15**, 150 (1974).
31. "Long-Range Carbon-Carbon Coupling Constants of 9-Labeled Anthracene Derivatives," J. L. Marshall, A. M. Ihrig, and D. E. Miiller, *J. Mag. Resonance*, **16**, 439 (1974).
32. "The Complete Proton Nuclear Magnetic Resonance Analysis of Norcamphor," J. L. Marshall and S. R. Walter, *J. Amer. Chem. Soc.*, **96**, 6358 (1974).
33. "Long-Range Carbon-Proton and Carbon-Carbon Spin-Spin Coupling Constants," J. L. Marshall, D. E. Miiller, S. A. Conn, R. Seiwel, and A. M. Ihrig, *Acct. Chem. Res.*, **7**, 333 (1974).
34. "Signs of Long-Range Carbon-Carbon Coupling Constants. Tri-¹³C- Labeled Tetrolic Ester," J. L. Marshall, D. E. Miiller, H. C. Dorn, and G. E. Maciel, *J. Amer. Chem. Soc.*, **97**, 460 (1975).
35. "Birch Reduction of [2.2]-Paracyclophane-2-carboxylic Acid," J. L. Marshall and B.-H. Song, *J. Org. Chem.*, **40**, 1942 (1975).
36. "Reasons for the Nonequivalence of the exo-exo and endo-endo Vicinal NMR Coupling Constants in Norbornane," J. L. Marshall, S. R. Walter, M. Barfield, A. P. Marchand, N. W. Marchand, and A. L. Segre, *Tetrahedron Letters*, **32**, 537 (1976).
37. "Electron Paramagnetic Resonance and INDO Study of Carbon-13 Hyperfine Splitting Constants in Benzyl Radical and Toluene Radical Anion," A. M. Ihrig, P. R. Jones, I. N. Jung, R. V. Lloyd, J. L. Marshall, and D. E. Wood, *J. Amer. Chem. Soc.*, **97**, 4477 (1975).
38. "Fourier Transform Analysis of the Temperature Data of Denton County," J. L. Marshall, *Texas Journal of Science*, **27**, 403 (1976).
39. "Alchemy and Alpha Chi Sigma," J. L. Marshall and G. R. Dobson, *The Alpha Chi Sigma Pledge Manual*, August, 1976.
40. "Long-Range Carbon-Carbon Spin-Spin Coupling Constants in Carboxyl Labeled Aromatic Carboxylic Acids and Dihydro Aromatic Carboxylic Acids," J. L. Marshall, L. G. Faehl, A. M. Ihrig, and M. Barfield, *J. Amer. Chem. Soc.*, **98**, 3406 (1976).
41. "Experimental and Theoretical Studies of the Conformational and Substituent Dependencies of Vicinal ¹³C-¹³C Coupling Constants. Impinging Multiple Rear-Lobe Effects," M. Barfield, S. A. Conn, J. L. Marshall, and D. E. Miiller, *J. Amer. Chem. Soc.*, **98**, 6253 (1976).

42. "Proton NMR Spin-tickling Studies of ^{13}C -Labeled Compounds. The Correlation of $J(\text{C,H})$ and $J(\text{H,H})$," J. L. Marshall and R. Seiwel, *Org. Mag. Res.*, **8**, 419 (1976).
43. "Vicinal ^{13}C - ^{13}C Spin-Spin Coupling Constants of 1-Butanols. Conformational and Substituent Effects," J. L. Marshall, S. A. Conn, and M. Barfield, *Org. Mag. Res.*, **9**, 404 (1977).
44. "Alternate pi-Bond Routes for Carbon-13 Carbon-13 Spin-Spin Coupling — Hydrconjugative sigma-pi vs Non-Classical p-p Interactions," J. L. Marshall, L. G. Faehl, and N. D. Ledford, *Spectrosc. Letters*, **9**, 877 (1976).
45. "Conformational Analysis of 1,4-Cyclohexadienes. Carbon-Proton Spin-Spin Coupling Constants in Dihydroaromatic Carboxylic Acids," J. L. Marshall, L. G. Faehl, C. R. McDaniel, Jr., and N. D. Ledford, *J. Amer. Chem. Soc.*, **99**, 321 (1977).
46. "The NMR Conformational Analysis of 1,4-Cyclohexadienes," J. L. Marshall, P. W. Rabideau, and J. W. Paschal, *J. Chem. Soc., Perkin II*, 842 (1977).
47. "Fourier Transform NMR Techniques: A Practical Approach." (book review) *J. Amer. Chem. Soc.*, **99**, 8126 (1977).
48. "Mass Spectrometry Studies of Norcamphor and Norbornyl Acetate," J. L. Marshall and S. R. Walter, *Texas Journal of Science*, **29**, 121 (1977).
49. "Mass Spectral Studies of Fluorenone and Fluorene," J. L. Marshall and R. Kattner, *Texas Journal of Science*, **30**, 77 (1978).
50. "Alchemy and Alpha Chi Sigma," G. R. Dobson and J. L. Marshall, *The Hexagon*, Winter, 42-59 (1978).
51. "Site of the Bond Breaking in Ligand-Exchange Reactions of 1,2- Bis(diphenylphosphino)ethane-tetracarbonylmolybdenum(0)," G. R. Dobson, K. J. Asali, J. L. Marshall, and C. R. McDaniel, Jr., *J. Amer. Chem. Soc.*, **99**, 8100 (1977).
52. "Substituent Conformational Effects in Vicinal Carbon-13-Carbon-13 Spin-Spin Coupling Constants," J. L. Marshall, L. G. Faehl, R. Kattner, and P. E. Hansen, *Org. Mag. Res.*, **12**, 169 (1979).
53. "The Additivity of NMR Carbon-Carbon Spin-Spin Coupling Constants," J. L. Marshall, L. G. Faehl, and R. Kattner, *Org. Mag. Res.*, **12**, 163 (1979).
54. "The a-Methyl Substituent Effect on Vicinal Coupling Constants Involving ^{13}C ," M. Barfield, J. L. Marshall, E. D. Canada, and M. R. Willcott, III, *J. Amer. Chem. Soc.*, **100**, 7075 (1978).
55. "Carbon-13 Magnetic Shielding from Beam-Maser Measurements of Spin-Rotation Interaction in Acetonitrile," S. G. Kukolich, G. Lind, M. Barfield, L. Faehl, and J. L. Marshall, *J. Amer. Chem. Soc.*, **100**, 7155 (1978).
56. "Nuclear Spin-Spin Coupling Via Non-Bonded Interactions. II. a-Substituent Effects for Vicinal Coupling Constants Involving ^{13}C ," M. Barfield, J. L. Marshall, and E. D. Canada, Jr., *J. Amer. Chem. Soc.*, **102**, 7 (1980).
57. "Nuclear Spin-Spin Coupling Via Non-Bonded Interactions. III. The Importance of Bridgehead Interactions on Vicinal ^{13}C - ^1H and ^{13}C - ^{13}C Coupling Constants in Bicycloalkanes," M. Barfield, S. E.

- Brown, E. D. Canada, Jr., N. D. Ledford, J. L. Marshall, S. R. Walter, and E. Yakali, *J. Amer. Chem. Soc.*, **102**, 3355 (1980).
58. "Conformational Analysis Utilizing Carbon-13-Carbon-13 Spin-Spin Coupling Constants: Diamantane (Congressane) Derivatives," J. L. Marshall and E. D. Canada, Jr., *J. Org. Chem.*, **45**, 3123 (1980).
59. "On the Steric Effect of a Bulky Group: The Stereochemistry of 1,4-Di-*t*-butyl-1,4-dihydronaphthalene and 1-*t*-Butyl-1,4-dihydro-naphthalene," J. L. Marshall, O. Saracoglu, C. R. McDaniel, Jr., N. L. Holy, N. P. Vail, A.-H. Nejad, and S.-J. Huang, *J. Org. Chem.*, **45**, 4271 (1980).
60. "The Electronic Spectrum of (-)-*S*-(*pS*)-2,5,3',6'-Tetrahydro[2.2]-paracyclophane-2-carboxylic Acid," J. L. Marshall and L. Hall, *Tetrahedron*, **37**, 1271 (1981).
61. "Nuclear Spin-Spin Coupling Via Nonbonded Interactions. The Orientational Dependence of α -Substituent Effects on Vicinal ^{13}C - ^{13}C Coupling Constants," M. Barfield, E. D. Canada, Jr., C. P. McDaniel, Jr., J. L. Marshall, and S. R. Walter, *J. Amer. Chem. Soc.*, **105**, 3411 (1983).
62. "Experimental and Theoretical Studies of ^{13}C - ^{13}C Coupling Constants. Conformational and Substituent Dependencies of Long Range Coupling Constants $4J(^{13}\text{C}-^{13}\text{C})$," S. R. Walter, J. L. Marshall, C. P. McDaniel, Jr., E. D. Canada, Jr., and M. Barfield, *J. Amer. Chem. Soc.*, **105**, 4185 (1983).
63. "Gold Embrittlement in Soldering Processes," J. L. Marshall, *Tex. Soc. Electron. Mic.*, **6**, 10 (1985).
64. "Fatigue of Solders," J. L. Marshall and S. R. Walter, *Int. J. Hybrid Microelectr.*, **10**, 11 (1987).
65. "Surface Characterization of Electrical Connector Failures in the Electronic Assemblies," *IEEE-CHMT*, Los Angeles, CA, May, 1988.
66. "The Mechanism of Solder Fatigue in Electronic Packaging," *Proc. Electr. Manuf. Symp.*, Naval Weapons Center, China Lake, CA, pp 389-409, Feb., 1988.
67. "Gold Embrittlement as a Failure Mode in Electronics," *Correlations*, **6**, No. 2, 5-9 (1988).
68. "Solder Fatigue in Electronics," *Brazing and Soldering*, No. 15, Autumn, 4-9 (1988).
69. "Scanning Electron Microscopy Correlation to Microstructure of Solder Joints," *Proceedings NEPCON '89*, Anaheim, CA, pp 1076-1085, March, 1989.
70. "Scanning Electron Microscopy Characterization of Solder Failure — Standard and Nonstandard Joints," *Proceedings NEPCON '90*, Anaheim, CA, 1361-1370, February, 1990.
71. "ESCA Analysis of Ageing of Metallic Surfaces: Solderability of Nickel Silver," *Proc. Electr. Manuf. Symp.*, 239-250, Naval Weapons Center, China Lake, CA, February, 1990.
72. "Correlation of Chemical Microstructure with Solderability of Printed Circuit Boards," *Proc. Soc. Adv. Mat. Proc. Eng.*, June, 1990, Albuquerque, NM.
73. "Curricula for the Master of Science and Doctor of Philosophy in Materials Science: A Survey of U.S. Materials Science Programs," R. F. Pinizzotto and J. L. Marshall, *J. Mater. Educ.*, Vol. **12**, 102-122 (1990).

74. "An Hypothesis for the Mechanism of Solderability Failure," J. L. Marshall, G. Lucey, C. Handwerker, D. Tench, and A. Sunwoo, *Proceedings NEPCON 91*, Anaheim, CA, 3-10, February, 1991.
75. "Scanning Electron Microscopy/Energy Dispersive X-ray Characterization of Solder — Solderability and Reliability," J. L. Marshall, Book Chapter in *Solder Joint Reliability*, J. H. Lau, ed., Van Nostrand Reinhold, New York, 173-224 (1991).
76. "Composite Solders," J. L. Marshall, G. Lucey, and J. Hwang, *Proc. IEEE Proceedings*, 647-652, May, 1991.
77. "ESCA Analysis of Ageing of Metallic Surfaces: Solderability of Nickel Silver," J. L. Marshall and D. E. Miiller, *Soldering & Surface Mount Technology*, No. 7, 3-9, February, 1991.
78. "Correlation of Chemical Microstructure with Solderability of PCB's," J. L. Marshall, D. E. Miiller, J. Sees, S. E. Matteson, D. Weathers, and L. Lichtenberg, *Circuit World*, **18**, No. 1, 17-21, October (1991).
79. "A Microstructural Study of the Action of Flux on Copper-Tin Intermetallics," J. L. Marshall, *Electrecon '91 Proceedings*, pp 130-141, October (1991).
80. "Microstructural and Mechanical Characterisation of 43/43/14 Tin/Lead/Bismuth," J. L. Marshall, J. Calderon, and J. Sees, *Soldering & Surface Mount Technology*, Number 9, pp 25-27, 33, October (1991).
81. "Composite Solders," J. L. Marshall, J. Calderon, J. Sees, G. Lucey, and J. S. Hwang, *IEEE-CHMT Transactions*, Vol. **14**, No. 4, December (1991).
82. "Microcharacterization of Composite Solders," J. L. Marshall, J. Sees, and J. Calderon, *Proceedings NEPCON 92*, Anaheim, CA, 1278-1283, February, 1992.
83. "Solderability Study of Sn/Pb Alloy After Artificial Ageing by Electrochemical Reduction Analysis and Wetting Balance Tests," J. L. Marshall, Y. Gao, L. A. Foster, and J. A. Sees, *Proc. Electr. Manuf. Symp.*, 319-329, Naval Weapons Center, China Lake, CA, February, 1993.
84. "The Formation and Growth of Intermetallics in Composite Solder," Y. Wu, J. A. Sees, L. A. Foster, C. Pouraghabagher, J. L. Marshall, E. G. Jacobs, and R. F. Pinizzotto, *J. Elect. Mater.*, Vol. **22**, No. 7, 769-777 (1993).
85. "The Pyramids — Cement or Stone?" K. D. Ingram, K. E. Daugherty, and J. L. Marshall, *J. Archeo. Sci.*, Vol. **20**, 681-687, 1993 (December).
86. "Interfaces and Intermetallics," J. L. Marshall, L. A. Foster, and J. A. Sees, Chapter 3, "Interfaces and Intermetallics," in D. R. Frear, S. N. Burchett, H. S. Morgan, and J. H. Lau, ed., *The Mechanics of Solder Alloy Interconnects*, pp 42-86, Van Nostrand Reinhold, New York, 1994.
87. "Examination of Various Soldered Surfaces and Electronic Components by Confocal Microscopy," J. L. Marshall, P. S. Braterman, J. Sees, C. Tan, and J. Zhao, *Soldering and Surface Mount Technology*, No. 20, pp 22-26, May (1995).
88. "ACS Historic Landmark Dedicated at Searcy, Arkansas," James L. Marshall, *The Southwest Retort*, March, 1996, pp 5-7.

89. "Developing Collaboration Between High Schools and the University," James L. Marshall, *The Southwest Retort*, May, 1996, pp 7-9.
90. "Nanostructural ESCA Analysis of PADS (Plasma Assisted Dry Soldering)-Treated Solder Surface," J. L. Marshall, in "Design and Reliability of Solders and Solder," *Proceedings of the Minerals, Metals, and Materials Society (TMS)*, R. KI. Mahidhara, D. R. Frear, S. M. L. Sastry, K. L. Murty, P. K. Liaw, W. L. Winterbottom, ed., Orlando, Florida, February 10-13, 1997, pp 105-110.
91. "Hard-Particle Reinforced Composite Solders. I. Microcharacterization," J. L. Marshall and J. Calderon, *Soldering and Surface Mount Technology*, No. 26, Now Vol. **9**, No. 2, 22-28 (July, 1997).
92. "Hard-Particle Reinforced Composite Solders. II. Solderability," J. L. Marshall and J. Calderon, *Soldering and Surface Mount Technology*, No. 27, Now Vol. **9**, No. 3, 6-10 (October, 1997).
93. "Hard-Particle Reinforced Composite Solders. III. Mechanical Properties," J. L. Marshall and J. Calderon, *Soldering and Surface Mount Technology*, No. 27, Now Vol. **9**, No. 3, 11-14 (October, 1997).
94. "The Confusing Tale of Soda and Al-Kali," James L. Marshall, *The Southwest Retort*, **52**, March, 2000, pp 5-6.
95. "Why Glauber's Salt is Not So_2O_4 ," James L. Marshall, *The Southwest Retort*, **52**, May, 2000, pp 17-18.
96. "Treasurers Out of Trash — Semiconductor Materials at Eagle-Picher Industries," *Chemical Heritage*, James L. Marshall and Leroy Page, **18**, No. 2, 6-7,36-39 (Summer, 2000)
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