



Wood Treatment Expertise

Member: ACS, AFPA, ANSI,
ASTM, AWWA, CWPA, FPS,
ICC, IRGWP, SWST

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CRAIG R. McINTYRE, Ph.D.

Curriculum Vitae

PROFESSIONAL SUMMARY

Over 30 years of diversified research and development and plant management experience predominantly in the forest products industry with major international chemical and wood product organizations. Expertise includes biocides (pressure/non-pressure), fire retardants, distribution and transmission poles, formulation development, wood treatment processes, wood chemistry, standardized testing, basic research, wood adhesives, code and regulatory issues, building systems, quality control (SPC, TQM) with numerous publications, presentations and patents in these areas. Craig was recently honored with the AWWA Award of Merit, their most prestigious honor.

EMPLOYMENT HISTORY

McIntyre Associates, Inc., Walls, MS 1993-Present
President

ISK Biosciences, Inc., Memphis, TN 1994-1998
Kodiak™ Development Manager

Hickson Corp. (former Div. of Koppers Co.), Atlanta, GA 1989-1992
Manager, Research and Development

Koppers Co., Inc., Pittsburgh, PA, 1975-1989
Manager, Special Projects
Manager, Wolman Product Development
Manager, Forest Products Group Product Development
Manager, Laminated Beam Plant (Magnolia, AR)
Research Scientist

Craig R. McIntyre, Ph.D.

Curriculum Vitae

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EDUCATION

Post Doctoral Assoc., Chemistry, Iowa State U., Ames, IA, 1975

Ph.D., Wood Chemistry, U. of Montana, Missoula, MT, 1975

NDEA Fellow

B.Sc., Chemistry, U. of Oregon, Eugene, OR, 1969

ACS Degree

ASSOCIATIONS and HONORS

American Chemical Society (ACS) (1969-Present)

American Forest and Paper Association (AFPA)

(formerly National Forest Products Association (NFPA))

Technical Advisory Committee (2000-Present, 1988-91)

Subcommittee on Fire (2000-Present, 1988-91)

Recognition of Excellence Award, 1990

American National Standards Institute (ANSI) Committee O5, (2003-Present)

American Society of Testing and Materials (ASTM) (1981-Present)

Chairman: Subcommittee, E-5.14, External Fire Exposure Tests (2007-Present)

First Vice-chairman: Committee E-5, Fire Standards (1986-1992)

Chairman: Subcommittee, E-5.21, Smoke and Combustion Products (1984-1986)

Active member: F-14, Fences (2005-Present)

Active member: D-7, Wood (1981-Present)

Award of Appreciation, 1988

American Wood Protection Association (AWPA) (1978-Present)

Award of Merit, 2007

Award of Appreciation, 2005

Executive Committee (2002-2005)

Award of Special Recognition, 2002

Chairman: Subcommittee T-2, Lumber and Timber (2000-2001)

Award of Special Recognition, 2000

Chairman: Subcommittee P-7, Fire Retardants (1991-1998)

Secretary: Subcommittee T-4, Poles (1999)

ASSOCIATIONS and HONORS (Continued)

Canadian Wood Preservation Association (CWPA) (1991-Present)

Forest Products Society (FPS) (1992-Present)
Wood Protection 2006 Organizing Committee, 2006

International Research Group on Wood Preservation (IRG) (1990-Present)
IRG 24 Organizing Committee, 1993

International Code Council (ICC) (2004-Present)

U.S. Department of Commerce NVLAP Wood Based Products Program (1992-1995)
Technical Assessor

Society of Wood Science and Technology (1998-Present)

PATENTS

E.A. Pasek and C.R. McIntyre, U.S. Patent 5,492,681, "Method for Producing Copper Oxide," Feb. 20, 1996. (Corresponding patents worldwide).

C.R. McIntyre and E.A. Pasek, U.S. Patent 4,950,329, "Wood Preservative Composition and Method of Treating Wood with Same," Aug. 21, 1990. (Corresponding patents worldwide).

C.R. McIntyre and D.A. Eakin, U.S. Patent 4,466,998, "Wood Impregnation," Aug. 21, 1984.

R.H. Moulton and C.R. McIntyre, U.S. Patent 4,326,669, "Laminated Wooden Railroad Crosstie Having Exposed End-Grain Forming Part of the Load Bearing Surface," Apr. 27, 1982.

PUBLICATIONS

Barnes, H.M., J.E. Winandy, C.R. McIntyre and P.D. Jones, 2010, "Laboratory and Field Exposures of FRT Plywood: Part 2—Mechanical Properties", Wood and Fiber Science, in press

McIntyre, C.R. and M.H. Freeman, 2009, "Use of Non-standard Tests for Evaluating Wood Preservatives," Forest Products Society 63rd Annual Meeting, Boise, ID, in press

McIntyre, C.R. and M.H. Freeman, 2009, "Micronized Copper", Proc. Amer. Wood Protect. Assoc. 105, in press

McIntyre, C.R., M.H. Freeman, T.F. Shupe, Q. Wu and D.P. Kamdem 2009, "The Form of Copper: Does It Really Matter?", Internat. Res. Group on Wood Preserv., IRG/WP/09-30513.

McIntyre, C.R., S.M. Cline and B. Overturf, 2009, "Acetylated Wood Performance Features," Proc. Amer. Wood Protect. Assoc. 105, in press

McIntyre, C.R. and P. Thompson, 2009, "FR Coatings for Structural Use" Proc. Amer. Wood Protect. Assoc. 105, in press

Cline, S.M. and C.R. McIntyre, 2009, "Evaluation of Acetylated Wood for International Code Council-Evaluation Services Listing," Proc. European Conference on Wood Modification 2009, in press

Freeman, M.H., C.R. McIntyre and R.E. Jackson, 2009, "A Critical and Comprehensive Review of Boron in Wood Preservation," Proc. Amer. Wood Protect. Assoc. 105, in press

Barnes, H.M., J.E. Winandy and C.R. McIntyre, 2009, "Bending Properties from Laboratory and Field Exposures of FRT Plywood," Proc. Amer. Wood Protect. Assoc. 105, in press

Barnes, H.M., G.B. Lindsey, T. Johnson, J. Hill and C.R. McIntyre, 2009, "Barrier Wrap Performance in Hazard Zone 4," Proc. Amer. Wood Protect. Assoc. 105, in press

Freeman, M.H. and C.R. McIntyre, 2008, "A Comprehensive Review of Copper Based Wood Preservatives with a Focus on New Micronized or Dispersed Copper Systems," For. Prod. J., 58(11): 6-27.

PUBLICATIONS (Continued)

Barnes, H.M., J.E. Winandy and C.R. McIntyre, 2008, "Laboratory and Field Exposures of FRT Plywood: Part 1—Physical Test Data," *Internat. Res. Group on Wood Preserv.*, IRG/WP/08-40426.

McIntyre, C.R. and M.H. Freeman, 2008, "Biological Efficacy of Micronized Copper Systems," *Internat. Res. Group on Wood Preserv.*, IRG/WP/08-30485.

M.H. Freeman and C.R. McIntyre, 2008, "A Comprehensive Review of Copper Based Wood Preservatives with a Focus on Micronized Copper," *Internat. Res. Group on Wood Preserv.*, IRG/WP/08-30486.

Freeman, M.H. and C.R. McIntyre, 2008, "The Wood Preservative Fungicide Cyproconazole: A Critical Review and Update," *Proc. Amer. Wood Protection Assoc.* 104, pp. 65-80

Schultz, T.P., D.D. Nicholas and C.R. McIntyre, 2008, "Recent Patents and Developments in Biocidal Wood Protection Systems for Exterior Applications," *Recent Patents Material Sci.*, 1(2): 128-134.

McIntyre, C.R. 2008. "American Wood-Preservers' Association and Building Code Procedures for New Preservative Systems". in Schultz *et al.*, eds "Development of Commercial Wood Preservatives", ACS Symposium Series 982, Amer. Chem. Soc. Washington, DC, pp. 524-536.

McIntyre, C.R. and M.H. Freeman 2007 "Copper-Polymeric Betaine Wood Preservative Systems" Appendix D of AC326, International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. and M.H. Freeman 2007 "Developing a New Wood Preservative and Potential Fire Retardant" *Proc. Amer. Wood Protection Assoc.* 103, pp. 128-130.

McIntyre, C.R. M.H. Freeman and H.M. Barnes, 2007, "What's New? Pros and Cons of Future Preservative Systems," *Proc. 2007 Southeastern Utility Pole Conference, For. Prod. Soc.*, Madison, WI, pp. 153-158

Barnes, H.M., C.R. McIntyre, D.W. Bullock, M.H. Freeman and G. B. Lindsey, 2007, "Penta Analysis: Is XRF Good Enough?" *Proc. 2007 Southeastern Utility Pole Conference, For. Prod. Soc.*, Madison, WI, p. 230.

PUBLICATIONS (Continued)

McIntyre, C.R. and M.H. Freeman 2006 “AC329 Acceptance Criteria for Waterborne Copper Oxide, Boric Acid and HDO Wood Preservative Systems” International Code Council-Evaluation Service, available at www.icc-es.org.

Freeman, M.H., C. R. McIntyre and J. Makuvek. 2006. “The use of Postsaver Barrier Wraps to Increase Service Life of Wood in Ground Contact” Proc. Amer. Wood Pres. Assoc., 102: 112-115.

M.A. Lake and C.R. McIntyre, 2006. “Formosan Termite Response to Weathered Borate-Treated Wood,” in “Wood Protection 2006”, For. Prod. Soc., Madison, WI.

McIntyre, C.R. 2005 “AC326 Acceptance Criteria for Proprietary Wood Preservative Systems—Common Requirements for Treatment Process, Test Methods and Performance” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R., H.M. Barnes and M.H. Freeman, 2005, “40-Year Assays Of Pentatreated Posts in DeQueen, Arkansas,” Proc. Amer. Wood Pres. Assoc., 101:181-186.

Freeman, M.H., C. R. McIntyre and J. Makuvek. 2005. “The use of Barrier Wraps to Increase Service Life of Treated and Untreated Wood in Ground Contact” Proc. Amer. Wood Pres. Assoc., 101: 85-88.

Robinson, P.L, J.E. Blasser, M.A. Lake and C.R. McIntyre, 2005. “Leaching Tests of ‘Controlled’ Borate Systems,” Proc. Amer. Wood Pres. Assoc., 101: 75-83.

McIntyre, C.R. 2005 “AC314 Acceptance Criteria for DCOIT Preservative Systems” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. and M.H. Freeman 2005 “AC313 Acceptance Criteria for Barrier Systems for Protection of Wood Posts Against Decay and Termites” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. 2005 “AC297 Acceptance Criteria for Acetylated Wood Preservative Systems” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. 2004. “Chilean Radiata Pine Poles: Treatment and Strength Studies,” Proc. Amer. Wood Pres. Assoc., 100:34-40

PUBLICATIONS (Continued)

McIntyre, C.R. 2004 “AC268 Acceptance Criteria for Organic Wood Preservative Systems” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R. and M.H. Freeman. 2004 “AC254 Acceptance Criteria for PXTS Wood Preservative” International Code Council-Evaluation Service, available at www.icc-es.org.

McIntyre, C.R., 2003. “A New Pole Species, Chilean Radiata Pine, in North American Standards,” Proc. 2003 Utility Pole Structures Conference, Reno, NV, November.

McIntyre, C.R., 2003. “Fire—Committee D07 Answers the Alarm,” ASTM Standardization News, June, pp. 36-9.

Brient, J.A., M.H. Freeman and C.R McIntyre, 2003. “Copper Naphthenate Update,” Proc. Amer. Wood Pres. Assoc., 99: 258-273.

McIntyre, C.R., 2004. “Protection of Wood from Fire” in Encyclopedia of Forest Science, eds. J. Burley, J. Evans and J. Youngquist, , Academic Press, San Diego, CA

McIntyre, C.R. and M.H. Freeman, 2002. “Copper Naphthenate—An Update On New Trends And Changes In The Last Decade,” Proc. Northeast Pole Conference, Binghamton, NY, October.

McIntyre, C.R. 2002. “Standard Practice for Calculating Design Value Treatment Adjustment Factors for Fire-Retardant-Treated Lumber. ASTM D 6841-02. ASTM International, Conshohocken, PA

McIntyre, C.R. 2001. “Subcommittee T2 Lumber and Timber Annual Report,” Proc. Amer. Wood Pres. Assoc., 98:181-186

McIntyre, C.R. 2001. “Subcommittee T2 Lumber and Timber Annual Report,” Proc. Amer. Wood Pres. Assoc., 97:141-147.

McIntyre, C.R. 2000. “Copper Naphthenate Performance: A New Way to Look at Old Data,” Internat. Res. Group on Wood Pres., IRG/WP 00-30215

McIntyre, C.R. 2000. “The Performance of Copper Naphthenate,” Proc. Sixth International Conference on Utility Line Structures, Fort Collins, CO, March

PUBLICATIONS (Continued)

McIntyre, C.R. 2000. "Subcommittee T4 Poles Annual Report," Proc. Amer. Wood Pres. Assoc., 96: 140-155.

McIntyre, C.R. 1999. "Why the AWPAs Need SPC," Proc. Amer. Wood Pres. Assoc., 95: 51. (Title Only.)

McIntyre, C.R. 1999. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc., 95: 148-9.

Kamdem, D.P. and C. R. McIntyre. 1999. "Laboratory Evaluation of CDDC as a Wood Preservative for Red Oak (*Quercus rubra*) and Red Maple (*Acer rubrum*)," Holz als Roh- und Werkstoff, 57: 69-72.

McIntyre, C.R. 1998. "An Update on CDDC," Proc. Amer. Wood Pres. Assoc., 94:148-164.

McIntyre, C.R. 1998. "Standard Practice for Calculating Bending Strength Design Adjustment Factors for Fire-Retardant-Treated Plywood Roof Sheathing. ASTM D 6305-98. ASTM International, Conshohocken, PA

McIntyre, C.R. 1998. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc., 94:84-85.

Kamdem, D.P., M. H. Freeman, C.R. McIntyre and T.L. Woods. 1998. "The Chemistry of Cu-Naphthenate Treated SYP: Effect of Post-Steamming," Proc. Amer. Wood Pres. Assoc., 94:15-29.

Kamdem, D.P. and C. R. McIntyre. 1998. "Chemical Investigation of 23-Year Old CDDC Treated Southern Yellow Pine," Wood and Fiber Science, 31(1), 64-71.

Cookson, L.J., C.R. McIntyre and D.K. Scown. 1998. "Laboratory Aquaria Evaluation of CDDC Against Marine Borers," Internat. Res. Group on Wood Preserv., IRG/WP/98-10262.

Craciun, R., D.P. Kamdem and C.R. McIntyre. 1997. "Characterization of Copper Dimethyldithiocarbamate (CDDC) Treated Wood with ESEM and other Spectroscopic Techniques," Holzforschung, 51:519-525.

PUBLICATIONS (Continued)

McIntyre, C.R. 1997. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc. 93:134-135.

Kamdern, D.P. and C. R. McIntyre. 1997. "Chemical Investigation of 23-Year Old CDDC Treated Southern Yellow Pine," Internat. Res. Group on Wood Pres., IRG/WP/97-30141.

McIntyre, C.R. 1996. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc. 92:175-177.

Gallacher, A.C., C.R. McIntyre, M.H. Freeman, D.K. Stokes and W.B. Smith. 1995. "A Comparison of Analytical Techniques" Internat. Res. Group on Wood Pres., IRG/WP/95-20061.

McIntyre, C.R. 1995. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc. 91:259-261.

Gallacher, A.C., C.R. McIntyre, M.H. Freeman, D.K. Stokes and W.B. Smith. 1995. "Standard and New Analytical Techniques for CDDC Preserved Wood Analysis," Proc. Amer. Wood Pres. Assoc. 91:194-207.

McIntyre, C.R. 1994. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc. 90:285-286.

Pasek, E.A. and C.R. McIntyre. 1993. "Treatment and Recycle of CCA Hazardous Waste," Internat. Res. Group on Wood Preserv., IRG/WP/93-50007

McIntyre, C.R. 1994. "Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant Treated Softwood Plywood Exposed to Elevated Temperatures". ASTM D 5516-04. ASTM International, Conshohocken, PA

McIntyre, C.R. 1993. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc. 89:415-417.

McIntyre, C.R. and R.F. Fox. 1992. "CCA/OIL for Northern Species," Proc. Canadian Wood Pres. Assoc. 13:138-154.

McIntyre, C.R. 1992. "Subcommittee P7 Fire Retardant Systems Annual Report," Proc. Amer. Wood Pres. Assoc. 88:392-395.

PUBLICATIONS (Continued)

Pasek, E.A. and C.R. McIntyre. 1992. "Burning of CCA Treated Wood with Minimal Metals Loss," AWPI Symposium on Treated Wood Life-Cycle Management.

Winandy, J.E., S.L. Levan, R.J. Ross, S.P. Hoffman and C.R. McIntyre. 1991. "Thermal Degradation of Fire-Retardant-Treated Plywood: Development and Evaluation of a Test Protocol," Res. Pap. FPL-RP-501, U.S. Dept. of Agriculture, Forest Service, Forest Products Laboratory, 21 p.

Pasek, E.A. and C.R. McIntyre. 1990. "Heat Effects on Fire Retardant-Treated Wood, J. Fire Sci., 8(6):405-20.

McIntyre, C.R. and R.F. Fox. 1990. "Update on Wolman ET, A New CCA/OIL Treating System," Proc. Amer. Wood Pres. Assoc. 86:63-77.

Courville, G.E., A.O. Desjarlais, R.P. Tye and C.R. McIntyre. 1990. "A Comparison of Two Independent Techniques for the Determination of *In Situ* Thermal Performance," Insulation Materials, Testing and Applications, ASTM STP 1030, D.L. McElroy and J.F. Kimpflen, Eds., ASTM, Philadelphia, , pp. 496-509.

McIntyre, C.R. 1989. "Update on Wolman ET, A New CCA/OIL Treating System," International Conference on Wood Poles and Piles, Fort Collins, CO, October 27, 1989

Lai, Y.Z., F. Shafizadeh and C.R. McIntyre. 1977. "Pyrolysis of Cellulose after Chlorination or Addition of Zinc Chloride," in J.C. Arthur, Jr., Ed., "Cellulose Chemistry and Technology, ACS Symposium Series, 48, pp. 256-272.

Shafizadeh, F., R.A. Susott and C.R. McIntyre. 1975. "Solid-state Transition and Thermodynamic Properties of Crystalline Thiolevoglucosan," Carbohydr. Res., 41: 351-4.

PRESENTATIONS

Forest Prod. Soc. Annual Meeting, June 2009

American Wood Protection Assoc. Annual Meeting, April 2009

European Conference on Wood Modification 2009

IRG Americas Meeting, 2008

PRESENTATIONS (Continued)

American Wood Protection Assoc. Annual Meeting, May 2008

IRG Annual Meeting, May 2007

American Wood Pres. Assoc. Annual Meeting, May 2007

2007 Southeastern Utility Pole Conference, February, 2007

Society of Wood Science and Technology Annual Meeting, June 2006

Green Chemistry and Engineering Conference, June 2006

Wood Protection 2006, March 2006

American Wood Pres. Assoc. Annual Meeting, May 2006

American Wood Pres. Assoc. Annual Meeting, May 2005

American Chemical Society Symposium, March 2005

American Wood Pres. Assoc. Annual Meeting, May 2004

Utility Pole Structures Conference, November 2003

American Wood Pres. Assoc. Annual Meeting, May 2003

Verizon Regional Meeting, April 2003

Northeast Pole Conference, October 2002

IRG Annual Meeting, May 2000

International Conference on Utility Line Structures, March 2000

American Wood Pres. Assoc. Annual Meeting, May 1999

American Wood Pres. Assoc. Annual Meeting, May 1998

Forest Prod. Soc. Annual Meeting, June 1995

PRESENTATIONS (Continued)

IRG Annual Meeting, May 1995

Can. Wood Pres. Assoc. Annual Meeting, Nov. 1992

American Wood Pres. Assoc. Annual Meeting, Apr. 1990

Fire Retardant Chemicals Assoc. Fall Conference, Oct. 1990
Forest Prod. Res. Soc. Annual Meeting, June 1990

International Pole Conference, July 1990

Can. Wood Pres. Assoc. Annual Meeting, Nov. 1989.

International Pole Conference, July 1989