

Cliff T. Johnston

Professor of Soil Chemistry
Crop, Soil and Environmental Sciences
Purdue University, West Lafayette, IN 47907

Education

B.Sc. University of California, Riverside (1979) Chemistry
Ph.D. University of California, Riverside (1983) Soil Chemistry.
Postdoctoral Fellow. (1983 - 1985) Los Alamos National Laboratory

Professional Positions

Los Alamos National Laboratory, Postdoctoral Fellow (1983 – 1985)
University of Florida, Soil and Water Science Dept. Asst.-Assoc Professor (1985 – 1993)
Los Alamos National Laboratory, Sabbatical Fellow (1991)
Katholieke Universiteit Leuven, Belgium, Sabbatical (1992 and 2002)
Purdue University, Department of Agronomy, Assoc. Professor - Professor (1993 – present)

Membership in Academic, Professional and Scholarly Societies

American Chemical Society
Clay Minerals Society
Mineralogical Society of America
Soil Science Society of America

Awards / Honors

1982 Graduate Regents Fellows at the University of California, Riverside
1983 Membership in Sigma Xi and Gamma Sigma Delta
1997 Elected to Council - Councilor for the Clay Minerals Society (1997 – 2000)
1999 General Chair for the 1999 Clay Minerals Society Meetings
2001 ESCOP Leadership Development Program Fellow (Class 10)
2001 Recipient of the Marion L. and Chrystie M. Jackson Mid-Career Award of The Clay Minerals Society
2002 Election to Fellow, Soil Science Society of America
2002 Recipient of the Marion L. and Chrystie M. Jackson Mid-Career Soil Science Award
2004 Vice President of The Clay Minerals Society
2002 Curator of the Source Clays Repository
2004 George Brown Lecturer – 2004 Clay Minerals Groups of the Mineralogical Society (London)
2005-6 President of The Clay Minerals Society
2006-7 Member of the Executive Committee for Elements – An international magazine of mineralogy, geochemistry, and petrology
2006-7 Member of Editorial Board for Geochemical Transactions
2007 Awarded a Fulbright Senior Specialist Grant – Brazil.

Publications - Journal Articles and Invited Reviews

1. Holtzclaw, K. H.; Schaumberg, G. D.; LeVesque, C.S.; Sposito, G.; Heick, J.A.; and C.T. Johnston. Analytical properties of the soluble, metal-complexing fractions in sludge-soil mixtures: V. Amino acids, hexosamines, and other carbohydrates in fulvic acid, *Soil Sci. Soc. Am. J.* 44:736-740, 1980.
2. Sposito, G., Holtzclaw, K.H., Johnston, C.T., and LeVesque, C.S. Thermodynamics of sodium-copper exchange on Wyoming bentonite at 298 K. *Soil Sci. Soc. Am. J.* 45:1079-1084, 1981.
3. Sposito, G., Holtzclaw, K.H., LeVesque, C.S.; and Johnston, C.T. Trace metal chemistry in arid zone field soils amended with sewage sludge: II. Comparative study of the fulvic acid fraction, *Soil Sci. Soc. Am. J.* 46:265-275, 1982.
4. Johnston, C.T., Sposito G., Bocian, D. F., and Birge, R.R. A vibrational spectroscopic study of the interlamellar kaolinite-dimethyl sulfoxide complex. *J. Phys. Chem.* 88:5959-5964, 1984.
5. Johnston, C.T., and Swanson, B.I. Temperature dependence of the vibrational spectra of acetanilide: Davydov solitons or Fermi coupling? *Chemical Physics Letters* 114:547-552, 1984.
6. Johnston, C.T., G. Sposito, and R. R. Birge. Raman spectroscopic study of kaolinite in aqueous suspension, *Clays and Clay Min.* 33:483-489, 1985.
7. Johnston, C.T.; and Sposito, G. Disorder and early sorrow. Progress in the chemical speciation of the soil solution. p. 89-100. In *Future developments in soil science research*, L.L. Boersma (ed.), Soil Sci. Soc. of Am. Publications, Madison, WI., 1987.
8. Scott, A.C., Bigio, I.J., and Johnston, C.T. Polarons in acetanilide. *Physical Review B.* B39:12883-12887, 1989.
9. Johnston, C.T., and Stone, D.A. The Influence of hydrazine on the vibrational modes of kaolinite. *Clays and Clay Minerals* 38:121-128, 1990.
10. Johnston, C.T., Raman and Fourier transform infrared spectroscopy. Chapter 5 in: *Instrumental Surface Analysis of Geologic Materials*. D. L. Perry (ed.) VCH Publishers, New York, NY. pp. 121-155, 1990.
11. Johnston, C.T. Raman and FT-IR spectra of the kaolinite-hydrazine intercalate. p. 432-454. Chapter 22 In *Spectroscopic characterization of minerals and their surfaces*, L.M. Coyne, S.W.S. McKeever, and D.F. Blake (eds.), Am. Chem. Soc. Books Series #415, Washington, D. C., 1990.
12. Johnston, C.T., Agnew, S.F., and D. L. Bish, D.L. Polarized single crystal FT-IR study of the Keokuk kaolinite and Ouray dickite. *Clays and Clay Minerals* 38:573-583, 1990.

13. Johnston, C.T., Tipton, T., Stone, D.A., Erickson, C., and Trabue, S.L. Vibrational and electronic spectroscopic study of p-dimethoxybenzene adsorbed on Cu-montmorillonite. *Langmuir* 7:289-296, 1991.
14. Ince, E., Johnston, C.T., and Moudgil, B.M. FT-IR spectroscopic study of adsorption of oleic acid/oleate on surfaces of apatite and dolomite. *Langmuir* 7:1453-1457, 1991.
15. Johnston, C.T., Swanson, B.I., and Agnew, S. F. Low frequency vibrational spectra of crystalline acetanilide at low temperature and high pressure. *J. Phys. Chem.* 95: 5281-5286, 1991.
16. Johnston, C.T., Tipton T., Trabue, S.L., Erickson C.; and Stone, D.A. Vapor phase sorption of p-xylene on Co- and Cu-exchanged SAZ-1 montmorillonite. *Environ. Sci. & Technol.* 26:382-390, 1992.
17. Pennell, K. D., Rhue R.D., Rao, P.S.C., Johnston, C.T. Vapor phase sorption of p-xylene and water on soils and clay minerals. *Environ. Sci. & Technol.* 26:756-763, 1992.
18. Jaynes, W. F., Traina, S.F., Bigham, J.M. and Johnston, C.T. Preparation and characterization of reduced-charge hectorites. *Clays and Clay Minerals* 40:397-405, 1992.
19. Johnston, C.T., Sposito, G. and Erickson, C. Vibrational probe studies of water interactions with montmorillonite. *Clays and Clay Miner.* 40:722-730, 1992.
20. Bish, D. and Johnston, C.T. Rietveld structural refinement of dickite at 12 K. *Clays and Clay Minerals* 41:297-304, 1993.
21. Johnston, C.T.; Sposito, G.; Earl, W. "Characterization of Environmental Particles by Fourier Transform Infrared and Nuclear Magnetic Resonance Spectroscopy" Chapter 1 in *Environmental Particles Volume 2 in the Environmental Analytical and Physical Chemistry Series* J. Buffle and H. P. van Leeuwen (eds.) Lewis Publishers, Boca Raton, FL. pp. 1-36, 1993.
22. Tipton, T., Johnston, C.T., Trabue, S.L., Erickson, C., Stone, D.A. Gravimetric/FTIR apparatus for the study of vapor sorption on clay films. *Review of Scientific Instruments* 64:1091-1092, 1993.
23. Schulze, D. G.; Johnston, C.T., and Bleam, W.F. Visualization of clay mineral structures. In *Clays: Controlling the Environment*. G.J. Churchman, R.W. Fitzpatrick and R.A. Eggleton (eds.) 10th International Clay Conference Proc., Adelaide Australia. CSIRO Publishing, Melbourne, Australia, pp. 15-18, 1993.
24. Hinedi, Z.H., Johnston, C.T. and Erickson, C. Chemisorption of benzene on Cu-montmorillonite as characterized by FTIR and ¹³C MAS NMR. *Clays and Clay Minerals* 41:87-94, 1993.

25. Johnston, C.T.; Davis, W.; Erickson, C.; and Delfino, J. FTIR Spectroscopic Characterization of Humic In Substances Humic substances in the global environment and implications on human health. p. 145-152. N. Senesi and T.M. Miano (ed.), 1994.
26. Okuda, I., Johnston, C.T. and Rao, P.S.C. Accessibility of solutes to geometrically rough (fractal) surfaces of natural sorbents. *Chemosphere* 30:2:389-395, 1995.
27. Johnston, C.T.; and Earl, W. Vibrational and NMR probe studies of water interactions with homoionic SAZ-1 montmorillonite. Chapter 9 in *Metal speciation and contamination of Soil*. H.E. Allen, C.P. Huang, G.W. Bailey, and A.R. Bowes (eds.) Lewis Publishers, Boca Raton, FL p. 237-254., 1995.
28. Johnston, C.T. Sorption of Organic Compounds on Clay Minerals: A surface functional group approach. Chapter 1 in *Organic Pollutants in the Environment*. B. Sawhney (ed.) Clay Minerals Society, Boulder Co. pp. 1-44, 1996.
29. Johnston, C.T.; Farmer, W.; and Aochi, Y. Fourier transform infrared and Raman spectroscopy. Chapter 10 in: "Methods of Soil Analysis, Part 3. Chemical Methods, Third Edition," D. Sparks (ed.), Soil Sci. Soc. of Am. Book Series no. 5., Madison, Wisconsin. p 269-321, 1996.
30. Madari, B., Micheli, E., Johnston, C.T., Gravel, J.G. and Czinkota I. Long term effects of tillage on the composition of soil organic matter: spectroscopic characterization. *Agrokem Es Talajtan* 46, 127-134, 1997.
31. Labouriau, A.; Johnston, C.T.; Earl, W. Cation and water interactions in the interlamellae of a smectite clay. Chapter 10 in "NMR Spectroscopy in Environmental Chemistry" Eds. M. A. Nanny, R. A. Minear and J. A. Leenheer. Oxford University Press, New York p. 181-197 (1997).
32. Johnston, C.T., Helsen, J., Schoonheydt, R. and Bish, D.L. Single-crystal Raman spectroscopic study of dickite. *American Mineralogist*, 83: 75-84, 1998.
33. Johnston, W. Xu, P. Parker, S.F. Agnew. Characterization of active sites on mineral surfaces: A spectroscopic study of water sorption on montmorillonite. In "The Latest Frontiers of Clay Chemistry. Proceedings of the Sapporo Conference on the Chemistry of Clays and Clay Minerals (Sapporo, Japan 1996)" A. Yamigishi, A. Aramata, and M. Taniguchi (eds.) Publ. Smectite Forum, Sendai Japan. pp. 47-69, 1998.
34. Nulins, K.H.L., H.G. Toufar, G.O.A. Janssens, R.A. Schoonheydt, and Johnston, C.T.. 1998. . In "The Latest Frontiers of Clay Chemistry. Proceedings of the Sapporo Conference on the Chemistry of Clays and Clay Minerals (Sapporo, Japan 1996)" Eds. A. Yamigishi, A. Aramata, and M. Taniguchi. Publ. Smectite Forum, Sendai Japan. pp. 116-133, 1998.

35. Bhatti, J.S., Comerford, N.B. and Johnston C.T. Influence of soil organic matter removal and pH on oxalate sorption onto a spodic horizon. *Soil Sci. Soc. Am. J.* 62:152-158, 1998.
36. Bhatti, J.S., Johnston, C.T. and Comerford, N.B. Influence of oxalate and soil organic matter on sorption and desorption of phosphate onto a Spodic horizon. *Soil Sci. Soc. Am. J.* 62:1089-1095, 1998.
37. Robinson, S., Johnston, C.T. and Reddy, K.R. Combined chemical and ³¹P NMR spectroscopic analysis of phosphorus in wetland organic soils. *Soil Science*, 163: 705-713, 1998.
38. Madari, B., Micheli, E., Czinkota, I., Johnston, C.T. and Gravel, J.G. Soil organic matter as indicator of changes in the environment. *Anthropogenic influences: Tillage Agrochem Es Talajtan* 47, 121-132, 1998.
39. Norton, L.D.; Altieri, R.; Johnston, C.T. Co-utilization of by-products for soil improvement and erosion control. *Beneficial Co-utilization of Agricultural-Municipal and Industrial Byproducts*. S. Brown (ed.) Klure Publ, Dordrecht, Netherlands, pp. 163-174, 1998
40. Davis, W.M., Erickson, C.L., Johnston, C.T, Delfino, J.J. and Porter, J.E. Quantitative Fourier Transform Infrared spectroscopic investigation of humic substance functional group composition. *Chemosphere* 38: 2913-2928, 1999.
41. Earl, W.; and Johnston, C.T. Chemical Speciation of Sorbed Compounds on Environmental Particles using Nuclear Magnetic Resonance Spectroscopy” Chapter 7 in *Environmental Particles Volume 4 in the Environmental Analytical and Physical Chemistry Series* P.M. Huang and N. Senesi (eds.) pp. 251-280, 1999.
42. Lin, L., Johnston, C.T., Blatchley E.R. Inorganic Fouling at Quartz: Water Interfaces in Ultraviolet Photoreactors I: Chemical Characterization, *Water Research* 33: 3321-3329, 1999.
43. Lin, L., Johnston, C.T., Blatchley. E.R., Inorganic Fouling at Quartz: Water Interfaces in Ultraviolet Photoreactors II: Temporal and Spatial Distributions, *Water Research* 33: 3330-3338, 1999.
44. Lin, L., Johnston, C.T., Blatchley E.R., Inorganic Fouling at Quartz: Water Interfaces in Ultraviolet Photoreactors III: Numerical Modeling, *Water Research* 33: 3339-3347, 1999.
45. Xu, W., Johnston, C.T., Parker, P. and Agnew, S.F. Infrared study of water sorption on Swy-1 and SAz-1 montmorillonite. *Clays and Clay Minerals*, 48:120-131, 2000.
46. Wang, S.L., Johnston, C.T. Assignment of the structural OH stretching bands of gibbsite. *American Mineralogist*, 85:739-744, 2000.

47. Burrell, L.S.; Johnston, C.T., Schulze, D., Klein, J., White, J.L., Hem, S.L. Aluminum phosphate adjuvants prepared by precipitation at constant pH. Part I: Composition and structure. *Vaccine*. 19:275-281, 2000.
48. Burrell, L.S.; Johnston, C.T., Schulze, D., Klein, J., White, J.L., Hem, S.L. Aluminum phosphate adjuvants prepared by precipitation at constant pH. Part II: Physiochemical properties. *Vaccine*, 19:282-287, 2000.
49. Johnston, C.T.; Eckert, J., Dotson, L., Bish, D.L. Vibrational spectroscopic study of the 1.035 and 0.95 nm kaolinite-hydrazine intercalation complexes. *Journal of Physical Chemistry*. 104: (33) 8080-8088, (2000). DOI:
50. Guest, C.; Johnston, C.T.; King, J.; Tishmack, J.K.; and Norton, L.D.. Synthetic soil from composting coal combustion byproducts and an industrial biosolid. *Journal of Environmental Quality*. 30:246-253, (2001)
51. Goldberg, S., Johnston, C.T. Mechanisms of arsenic adsorption on amorphous oxides evaluated using macroscopic measurements, vibrational spectroscopy, and surface complexation modeling. *J. of Colloid and Interface Science* 234:204-216 (2001)
52. Johnston, C.T., and Premachandra, G.S. Polarized ATR-FTIR study of smectite in aqueous suspension. *Langmuir* 17: 3712-3718, (2001).
53. Boyd, S.A., Sheng, G.; Teppen, B.J.; Johnston, C.T. Mechanisms for the adsorption of substituted nitrobenzenes by smectite clays. *Environ. Sci. Technol.*, 35 (21), 4227 - 4234, (2001).
54. Sheng, G.Y., Johnston, C.T., Teppen B.J., Boyd, S.A. Potential contributions of smectite clays and organic matter to pesticide retention in soils *J Agr. Food Chem* 49: 2899-2907, (2001).
55. Johnston, C.T.; Olivera, M.F., Teppen, B.J.; Sheng, G.; Boyd, S.A. Spectroscopic study of nitroaromatic-smectite sorption mechanisms. *Environ. Sci. Technol.*, 35 (24): 4767-4772 (2001).
56. Sheng, G.; Johnston, C.T.; Teppen, B.J.; Boyd, S.A. Adsorption of dinitrophenol herbicides from water by montmorillonites. *Clays Clay Minerals*. 50: 25-34 (2002).
57. Johnston, C.T.; Wang, S.L.; Hem, S.L. Measuring the surface area of aluminum hydroxide adjuvant. *J. Pharmaceutical Sciences*. (7):1702-1706 (2002)
58. Johnston, C.T.; Agnew, S.F.; Schoonover, J.R.; Kenney, J.W.; Page, B.; Osborn, J. and Corbin, R. Raman study of aluminum speciation in simulated alkaline nuclear waste. *Environmental Science and Technology*. 36 (11):2451-2458 (2002).

59. Johnston, C.T.; G. Sheng; Teppen, B.J.; Fernandes de Oliveira, M.; Boyd, S.A. Spectroscopic study of dinitrophenol herbicide sorption on smectite. *Environmental Science and Technology*. 36 (23): 5067-5074 (2002).
60. Johnston, C.T.; Bish, D.L.; Dera, P.; Wang, S.L.; Agnew, S.F.; and Kenney, J.W. Novel pressure-induced phase transformations in hydrous layered materials. *Geophysical Research Letters*. 29 (16): art. no. 1770 (2002).
61. Johnston, C.T.; and Tombacz, E. Surface Chemistry of Soil Minerals. Chapter 2 in "Soil Mineralogy with Environmental Applications" J. Dixon and D. Schulze (eds.) pp. 37-68. (2002).
62. Michéli, E., Madari, B., Tombacz E. Johnston C.T., 2002. Tillage – soil organic matter relationships in long-term experiments in Hungary and Indiana. Chapter 4. p. 565-581. In: R. Lal, J. Kimble, R. F. Follett, and B.A. Stewart (eds.): *Advances in Agronomy. Agricultural Practices and Policies for Carbon Sequestration in Soil*. Adv. Soil Sci. CRC Press, Boca Raton, FL. (2002)
63. Johnston, C.T. and S.L. Wang. (2002) Applications of vibrational spectroscopy in soil and environmental sciences. In "Handbook of Vibrational Spectroscopy" Eds. P.R. Griffiths and J.C. Chalmers. John Wiley, New York, New York. Volume 4. *Applications in Industry Materials and the Physical Sciences*, pp. 3192-3206.
64. Li, H.; Sheng, G.; Teppen, B.J.; Johnston, C.T.; Boyd, S.A. Sorption and desorption of pesticides by clay minerals and humic acid-clay complexes. *Soil Science Society of America Journal*. 67 (1): 122-131 (2003).
65. Hou, X.; Bish, D.L.; Wang, S.L.; Johnston, C.T.; Kirkpatrick, R.J. Hydration, expansion, structure, and dynamics of layered double hydroxides. *American Mineralogist*. 88 (1): 167-179 (2003).
66. Wang, S.L.; Johnston, C.T.; Bish, D.L.; White, J.L.; Hem, S.L. Water-vapor adsorption and surface area measurement of poorly crystalline boehmite. *J. Colloid and Interface Science* 260 (1): 26-35 (2003).
67. Ras, R.H.A.; C. T. Johnston, E. A. Franses, R. Ramaekers, G. Maes, P. Foubert, F. C. De Schryver, R. A. Schoonheydt Polarized Infrared Study of Hybrid Langmuir-Blodgett Monolayers Containing Clay Mineral Nanoparticles *Langmuir* 19 (10): 4295-4302 (2003).
68. Johnston, C.T.; Hem, S.L.; Guenin, E.; Mattai, J. Afflito. Potentiometric/turbidometric titration of aluminum compounds. *J. Cosm. Sci*, 54, 113-118 (2003).
69. Dera, P.; Prewitt, C.; Bish, D.L.; Japel, S.; Johnston, C.T. Pressure-controlled polytypism in hydrous layered materials. *American Mineralogist* 88 (10); 1428-1435 (2003).

70. Schoonover, J.R.; Zhang, S.L.; Johnston, C.T. Raman Spectroscopy and Principal Factor Analysis of Concentrated Al₂O₃-Na₂O-H₂O Solutions. *Journal of Raman Spectroscopy*. 34(6): 404-412, (2003).
71. Jiang, D.; Johnston, C.T.; Hem, S.L. Using rate of acid neutralization to characterize aluminum phosphate adjuvant. *Pharmaceutical Development and Technology* 8 (4): 349-356 (2003)
72. Ras, R.H.A.; Németh, J.; Johnston, C.T.; Dékány, I.; Schoonheydt, R.A.. Orientation and conformation of octadecyl rhodamine B in hybrid Langmuir-Blodgett monolayers containing clay minerals. *Physical Chemistry Chemical Physics* 6 (23): 5347-5352 (2004).
73. Johnston, C.T.; Boyd, S.A.; Teppen, B.J.; Sheng G., Sorption of Nitroaromatic Compounds on Clay Surfaces. in *Handbook of Layered Materials for Catalytic Applications*, S. M. Auerbach, K. A. Carrado, P. K. Dutta, Eds.; Marcel-Dekker: NY, pp. 155-189 (2004)
74. Li, H.; Teppen, B.J; Johnston, C.T.; Boyd, S.A., Thermodynamics of Nitroaromatic Compound Adsorption from Water by Smectite Clay. *Environmental Science and Technology* 38 (20): 5433-5442 (2004).
75. Dontsova, K.M.; Norton, L.D.; Johnston, C.T.; Bigham, J.M., Influence of exchangeable cations on water adsorption by soil clays. *Soil Science Society of America*, 68 (4):1218-1227 (2004).
76. Sato, H.; Ono, K.; Johnston, C.T.; Yamagishi, A. First-Principle Study on Polytype Structures of 1:1 Dioctahedral Phyllosilicates. *American Mineralogist* 89 (11-12): 1581-1585 (2004).
77. Jiang, D; Premachandra, G.S.; Johnston, C.T.; Hem, S.L. Structure and adsorption properties of commercial calcium phosphate adjuvant. *Vaccine* 23 (5): 693-698 (2004).
78. Ras, R.H.A.; Nemeth, J.; Johnston, C.T.; Dekany, I.; Schoonheydt, R.A. Infrared reflection absorption spectroscopy study of smectite clay monolayers *Thin Solid Films* 466 (1-2): 291-294 (2004).
79. Ras, R.H.A.; Németh, J.; Johnston, C.T.; DiMasi, E.; Dékány, I.; Schoonheydt, R.A.. Hybrid Langmuir-Blodgett Monolayers containing Clay Minerals: Effect of Clay Concentration and Layer Charge Density on the Film Formation. *Phys. Chem. Chem. Phys. (PCCP)*. 6 (16): 4174-4184 (2004).
80. Li, H.; Teppen, B.J.; Laird, D.A.; Johnston, C.T.; Boyd, S.A. Geochemical modulation of pesticide sorption on smectite clays. *Environmental Science and Technology* 38 (20): 5393-5399 (2004).

81. Arroyo LJ, Li H, Teppen BJ, et al. Hydrolysis of carbaryl by carbonate impurities in reference clay SWy-2 J. Agric. Food Chem. 52 (26): 8066-8073 (2004).
82. Dontsova, K.M., Norton, L.D., Johnston, C.T. Calcium and magnesium effects on ammonia adsorption by soil clays. Soil Science Society of America Journal 69:1225–1232 (2005).
83. Chappell, M.A., Laird D.A., Thompson M.L., Li H., Teppen B.J., Aggarwal V., Johnston C.T., Boyd S.A. Influence of smectite hydration and swelling on atrazine sorption behavior. Environmental Science & Technology 39 (9): 3150-3156 (2005).
84. Ras, R.H.A., Johnston, C.T., Schoonheydt, R.A. Chemical instability of octadecylammonium monolayers. Chemical Communications (32): 4095-4097 2005
85. Arroyo., L.J., Li, H., Teppen, B.J., Johnston, C.T. Boyd, S.A. Oxidation of 1-naphthol coupled to reduction of structural Fe³⁺ in smectite. Clays and Clay Minerals 53(6): 587-596 (2005).
86. Sato, H., Ono, K., Johnston, C.T., Yamagishi, A. First-Principles Studies on the Elastic Constants of a 1: 1 Layered Kaolinite Mineral. American Mineralogist 90(11-12): 1824-1826 (2005).
87. Fernandes de Oliveira, M.F., Johnston, C.T., Premachandra, G.S., Teppen, B.J., Li, H., Laird, D.A., Zhu, D., Boyd, S.A. Spectroscopic Study of Carbaryl Sorption on Smectite from Aqueous Suspension. Environmental Science & Technology 39: 9123-9129 (2005).
88. Schoonheydt, R.A. and Johnston, C.T. Surface and interface chemistry of clay minerals. Chapter 3 in “Handbook of Clay Science I in Series ‘Developments in Clay Science’” Eds. F. Bergaya, B.K.G. Theng & G. Lagaly, Elsevier Science LTD. Pages 87-112, ISBN-13 978-0-08-044183-2 (2006)
89. H Li, B.J. Teppen, D.A. Laird, C.T. Johnston, S.A. Boyd. Effects of increasing potassium chloride and calcium chloride ionic strength on pesticide sorption by potassium- and calcium smectite. Soil Science Society of America Journal 2006 70: 1889-1895 (2006).
90. R.H.A. Ras, Y. Umemura, C.T. Johnston, A. Yamagishi and R.A. Schoonheydt. Ultrathin Hybrid Films of Clay Minerals. Invited Review. Physical Chemistry Chemical Physics 9(8): 918-932 (2007).
91. H. Li, T.R. Pereira, B. J. Teppen, D.A. Laird, C.T. Johnston, and S.A. Boyd. Ionic strength-induced formation of Smectite Quasicrystals Change Upon Sorption of Nitroaromatic Compounds. Environmental Science and Technology 41(4): 1251-1256 (2007).

92. J. R. Schoonover, W. P. Steckle, Jr., C. T. Johnston, Y. Wang, A. M. Gillikin, and R.A. Palmer. Humidity-Dependent Dynamic Infrared Linear Dichroism Study of a Poly(Ester Urethane) Spectrochimica Acta Part A. Vol 67 (1) 208-213, 2007:
93. S. Goldberg, C.T. Johnston, D.L. Suarez, S.M. Lesch. Mechanisms of molybdenum adsorption on soil minerals evaluated using vibrational spectroscopy and surface complexation modeling. Chapter in "Adsorption of Metals by Geomedia II" M.O. Barnett and D.B. Kent (eds.) Elsevier book series "Developments in Earth and Environmental Sciences". Expected publication date: October 2007.
94. T. R. Pereira, D.A. Laird, C. T. Johnston, B. J. Teppen, H. Li, and S.A. Boyd. Mechanism of dinitrophenol Herbicide Sorption on Smectites in Aqueous Suspensions at varying pH. Soil Science Society of America. *In Press*. Soil Science Society of America Journal.
95. I.W. Wait, C.T. Johnston, E.R. Blatchley. The influence of groundwater treatment processes on quartz lamp sleeve fouling in ultraviolet disinfection reactors. (*Accepted with minor revision 2/14/2007*). Water Research.
96. S.L. Hem, C.T. Johnston, H. Hogenesch. Inject Alum is not an alternative to aluminum hydroxide adjuvant or aluminum phosphate adjuvant. *In Press (4/19/2007)*. Vaccine.
97. M. Santagata, A Bobet, C. T. Johnston, J. Hwang. One-dimensional compression behavior of a highly organic soil. ASCE J. of Geotechnical and Geoenvironmental Engineering. *In Press (3/9/2007)*
98. R.H.A. Ras, C.T. Johnston, R.A. Schoonheydt. Relation between s-polarized and p-polarized internal reflection spectra: Application for the spectral resolution of perpendicular vibrational modes. J. Phys. Chem. A, 111 (36) 8787-8791 (2007)
<http://dx.doi.org/10.1021/jp073108a>
99. T. Szabo, M. Szekeres, I. Dekany, C. Jackers, S. De Feyter, C.T. Johnston, and R.A. Schoonheydt. Layer-by-layer construction of ultrathin hybrid films with proteins and clay minerals. J. Phys. Chem. C 111, 12730-12740 (2007).
<http://dx.doi.org/10.1021/jp0722861>
100. T.R. Filley, McCormick, M.K., Crow, S.E.; Szlavecz, K.; Whigham, D.F.; Johnston, C.T.; van den Heuvel, R.N. Comparison of the chemical alteration trajectory of *liriodendron tulipifera* litter among forests with different invasive earthworm activity. J. Geophysical Research – Biogeosciences. 113, G01027 (2008)
<http://dx.doi.org/10.1029/2007JG000542>
101. T. R. Pereira, D.A. Laird, M. L. Thompson, C. T. Johnston, B. J. Teppen, H. Li, and S.A. Boyd. Role of smectite quasicrystal dynamics in adsorption of dinitrophenol. *Soil Sci.Soc.Am.J.* 72 (2):347-354, 2008. <http://dx.doi.org/10.2136/sssaj2007.0081>

102. E.A. Haack, C.T. Johnston, and P.A. Maurice. Mechanisms of hydroxamic acid siderophore sorption to monoionic smectite and siderophore-enhanced release of structural Fe³⁺. *Geochimica et Cosmochimica Acta*. *In Press, March 2008*
103. C.T. Johnston, J. Elzea-Kogel, D.L. Bish and H.H. Murray. Low temperature FTIR study of structural disorder in kaolin group minerals. *Clays and Clay Minerals*. *In Press as of March 2008*.

Articles which are in draft form

104. C.T. Johnston, R.H.A. Ras, R.A. Schoonheydt. Probing the nanoscale architecture of clay minerals (invited review). In preparation for the journal *Clay Minerals*.
105. D.H. Kang, A.P. Schwab, C.T. Johnston, M.K Banks. Sorption of Iron Cyanide Complexes onto Clay Minerals, Manganese Oxide, and Soil. *Soil Science Society of America Journal* (In Preparation).
106. H. Sato, K.Ono, C.T. Johnston, A. Yamagishi. Pressure induced phase transformations in dickite as studied by first principle calculations. In preparation for *American Mineralogist* (last paper of 3 part series – see papers # 76 and # 86).
107. B. Singh, C.T. Johnston, and S. Goldberg. In situ ATR-FTIR spectroscopy and batch adsorption study of phosphate adsorption on goethite (In Preparation)

Graduate Students and Postdoctoral Supervision

Current Graduate Students

Eric Johnson (Ph.D. – 2006-present) Molecular Mechanisms of glyphosate interactions in soils.

Kiran Rana (Ph.D. 2007-present) Geochemical Controls on the Adsorption, Bioavailability, and Long-term Environmental Fate of Dioxins, PCBs, and PAHs

Students Graduated and Postdoctoral Researchers Supervised/advised

Kiran Rana (M.Sc. 2004-2007) Influence of low molecular weight organic acids on the release of P from highly weathered soils in Brazil and Kenya. (Currently a Ph.D. student in our lab group)

Susan Crow (Postdoc 2006-2007 in Earth and Atmospheric Science at Purdue University with Tim Filley) Comparison of the chemical alteration trajectory of *liriodendron tulipifera* litter among forests with different invasive earthworm activity. Susan worked in my lab for a few months resulting in a recent journal article submission to *JGR*

Alfredo de Campos (Ph.D. 2003-2007) Effects of Redox on the soil solution chemistry and aggregate stability of Midwest Upland soils. Current position: Assistant Professor of Soil

Chemistry - Universidade Federal de Goiás. Instituto de Estudos Sócio-Ambientais, Cx.P.131, Goiânia, G.O., Brasil.

Balwant Singh (Visiting Professor – hosted Balwant's sabbatical in 2006) Balwant is Professor Soil Chemistry at the University of Sydney, Australia.

Elizabeth Haack (Postdoc 2005-2007 at the Center for Environmental Science and Technology at the University of Notre Dame; advisor Patricia Maurice). Collaborated with Liz and Patricia for the past year and a half and Liz spent time working in our lab resulting in several presentations and a recent journal article submission to GCA.

Dongqiang Zhu (Postdoc 2004-2005) Geochemical Controls on the Adsorption, Bioavailability, and Long-term Environmental Fate of Pesticides. Mechanisms. Don is an Assistant Professor at the State Key Laboratory of Pollution Control, School of The Environment, Nanjing University Nanjing 210093, P.R. China

Katerina Dontsova (Ph.D. 2002) Ca^{2+} and Mg^{2+} effects of water and ammonia adsorption by soil clays. Katerina's Ph.D. was supervised by Dr. L.D. Norton and much of her research was conducted in and supervised by C.T. Johnson. Current position: Research scientist working at US Army Corps of Engineers, Vicksburg, MS.

Maurilio Fernandes de Oliveira (Postdoc 2001-2003) Spectroscopic studies of pesticide sorption on soil minerals. Maurilio is now a staff scientist working for EMBRAPA in Sorghum and Maize, Brazil.

Shan Li Wang (Ph.D. 1998-2002) Spectroscopic and structural studies of aluminum oxides. Current position: Assistant Professor of Soil Chemistry at National Chung-Hsing University, Taichung, Taiwan.

Beáta Eموke Madari (Ph.D. 1995-2008) The effect of tillage on the nature and properties of humic substances. Current position: Embrapa Solos Ministério da Agricultura, Brasil. Beata received her Ph.D. from Godollo Agricultural University, Godollo, Hungary. (I was appointed to their graduate faculty to co-advise Beata's thesis along with Prof. Erika Micheli).

Christopher A. Guest (M.Sc. 1994-1997) Synthetic soil from composting coal combustion byproducts and an industrial biosolid. (Went on for Ph.D. in soil mineralogy at Purdue University). Current position: Private consultant working in the U.K.

Weizong Xu (M.Sc. 1994-1997) Vibrational probe studies of sorbed water, structural hydroxyl groups and surface acidity on montmorillonite by FTIR/Gravimetric methods. (Went on for Ph.D. in physical chemistry at Purdue University) Staff scientist working for Alcoa.

Steve Trabue (M.Sc. 1988-1991) Sorption of p-xylene and water on Cu-montmorillonite. Completed Ph.D. in soil microbiology at the University of Florida. Current position: Research Scientist at the National Soil Tilth Laboratory, Ames, IA.

Graduate Committees (Current or graduate in the past two years)

Xiadong Gao. Ph.D. Soil Mineralogy (D. Schulze) (completed April 2007)
Mary Gumz. Ph.D. 2007. Horticulture (S. Weller) (completed March 2007)
Joon Ho Hwang, Ph.D. 2006 Civil Engineering (M. Santagata) (completed Nov. 2006)
Pamela Achieng Obura. Ph.D. (current) Soil Mineralogy – D. Schulze)
Chadi Said El Mohtar. Ph.D. (current) Civil Engineering – M. Santagata and A. Bobett
Bethany Hanson. Ph.D. (current) Pharmacy. (S. Hem)
Micah Todd Humphreys. Ph.D. (current) Soil Chemistry (A.P. Schwab)
Agnieszka Magdalena Szlezak Ph.D. 2006. Soil Chemistry (A.P. Schwab / K. Bank – Civil)
(completed August 2006)
Julia Patrice Clark. M.Sc. (current) Civil Engineering (M. Santagata)
Jared Wade Alsdorf Ph.D. (current) Agronomy – Remote Sensing (T. Vyn)
Branly Eugene Ph.D. (current) Soil Fertility – Soil Chemistry (B. Joern)
Timothy Patrick Porter M.Sc. (current) Soil Fertility – Soil Chemistry (G. Van Scoyoc)
Jennifer Ann Maguire Ph.D. (current) Pharmacy (S. Hem)
Salvador Francisco Acua Ph.D. (current) Soil Fertility/Chemistry (D. Norton)
Dong Hee Kang Ph.D. 2006. Civil Engineering (K Banks)
Isaac William Wait. Ph.D. 2005 Civil Engineering (E.R. Blatchley)
Bradford Everett Derrick, M.Sc. 2005 Civil Engineering (E.R. Blatchley)
William Clayton Smith, M.Sc. 2005. Soil Mineralogy (D. Schulze)