

Research Publications

1. Brazel C.S. and N.A. Peppas. "Temperature- and pH- Sensitive Hydrogels for Controlled Release of Heparin and Streptokinase," in A.G. Mikos, R.M. Murphy, H. Bernstein and N.A. Peppas, eds. Biomaterials for Drug and Cell Delivery, Materials Research Society, Pittsburgh, (1994) 211-216.
2. Brazel, C.S. and N. A. Peppas. "Pulsatile Release of Antithrombotic Agents from pH- and Temperature-Sensitive Hydrogels," *Proceed. Intern. Symp. Rec. Adv. Drug Delivery Systems*, **7** (1995) 183-184.
3. Brazel C.S. and N.A. Peppas. "Transport in Hydrophilic Polymer Gels: Applications in Zero-Order Controlled Release," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **22** (1995) 350-351.
4. Brazel, C.S. and N.A. Peppas. "Thermo- and Chemo- Mechanically Responsive Poly(N-isopropylacrylamide-co-methacrylic acid) Hydrogels," *Macromolecules*, **28** (1995) 8016-8020.
5. Peppas, N.A., S.K. Vakkalanka, C.S. Brazel, A.S. Luttrell and N.K. Mongia. "Controlled Release Systems Using Swellable Random and Block Copolymers and Terpolymers," in Okano, T., N. Ogata, J. Feijen and S.W. Kim, eds. Advances in Biomedical Polymers in Biomedical Engineering and Drug Delivery Systems, Springer, Tokyo, (1996) 3-7.
6. Brazel, C.S. and N.A. Peppas. "On the Mechanisms of Water Transport and Drug Release from Swellable Hydrogels," *Polym. Mater. Sci. Engin. Prepr.*, **74** (1996) 370-371.
7. Brazel, C.S. and N.A. Peppas. "Pulsatile Local Delivery of Thrombolytic and Antithrombotic Agents Using Poly(N-isopropylacrylamide-co-methacrylic acid) Hydrogels," *J. Controlled Release*, **39** (1996) 57-64.
8. Peppas, N.A., S.K. Vakkalanka, and C.S. Brazel. "Unique Swelling Controlled Release Systems Based on T- and pH- Sensitive Terpolymers for Fibrinolytic Enzyme Delivery," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **23** (1996) 267-268.
9. Vakkalanka, S.K., C.S. Brazel and N.A. Peppas. "Temperature- and pH- Sensitive Terpolymers for Modulated Delivery of Streptokinase," *J. Biomater. Sci., Polym. Ed.*, **8** (1996) 119-129.
10. Hoffman, A.S., G. Chen, X. Wu, Z. Ding, B. Kabra, K. Randeri, M. Schiller, E.S. Ron, N.A. Peppas and C.S. Brazel. "Graft Copolymers of PEO-PPO-PEO Triblock Polyethers on Bioadhesive Polymer Backbones: Synthesis and Properties," *Polym. Preprints*, **38** (1997) 524-525.
11. Hoffman, A.S., G. Chen, X. Wu, Z. Ding, B. Kabra, K. Randeri, M. Schiller, E.S. Ron, N.A. Peppas and C.S. Brazel. "Graft Copolymers of PEO-PPO-PEO Triblock Polyethers on Bioadhesive Polymer Backbones for Use as Drug Delivery Carriers," *Polym. Mater. Sci. Engin. Prepr.*, **76** (1997) 271-272.
12. Peppas, N.A., A.M. Lowman, C.S. Brazel, and C.L. Bell-Huff, "Oral Drug Delivery Using Swellable and pH-Sensitive Systems," *Proceed. Controlled Release Soc.-Greek Chapter*, **1** (1997) 1-6.
13. Brazel, C.S. and N.A. Peppas. "Analysis of Swelling-Controlled Release Systems for Optimization of Drug Delivery," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **24** (1997) 169-170.
14. Pabalan, R.T., M.S. Jarzempa, T.A. Abrajano, D.A. Pickett, S. Moulton, N. Sridhar, J. Weldy, C.S. Brazel and J.T. Persyn. "Hanford Tank Waste Remediation System High Level Water Chemistry Manual," Nuclear Regulatory Commission NRC 02-93-005, 1997.
15. Brazel, C.S. and N.A. Peppas. "Mechanisms of Solute and Drug Transport in Relaxing Swellable Hydrophilic Glassy Polymers," *Polymer*, **40** (1999) 3383-3398.
16. Brazel, C.S. and N.A. Peppas. "Dimensionless Analysis of Swelling of Hydrophilic Glassy Polymers with Subsequent Drug Release from Relaxing Structures," *Biomaterials*, **20** (1999) 721-732.
17. Brazel, C.S. "Microencapsulation: Offering Solutions in the Food Industry," *Cereal Foods World*, **44** (1999) 388-393.

Research Publications (cont'd)

18. Marshall, M.C., S. Wellinghoff, C. Brazel, M. Alexander and S. Akatagawa, "Controlled Delivery of Pesticides through Synthetic Biodegradable Polymer Compositions", in H. Scher, ed. Controlled Release Delivery Systems for Pesticides, New York: Marcel Dekker, Inc., 1999, 363-394.
19. Pabalan, R.T., V. Jain, R.F. Vance, S. Ioannidis, D.A. Pickett, C.S. Brazel, J.T. Persyn, E.J. Taylor and M.E. Inman. "Hanford Tank Waste Remediation System Pretreatment Chemistry and Technology," Nuclear Regulatory Commission NRC 02-97-009, 1999.
20. Brazel, C.S. and N.A. Peppas. "Modeling of Drug Release from Swellable Polymers," *Eur. J. Pharm. and Biopharm.*, **49** (2000) 47-58.
21. Brazel, C.S. and N.A. Peppas, "Recent Studies and Molecular Analysis of Drug Release from Swelling-Controlled Devices," *STP Pharma Sci.* **9** (1999) 473-485.
22. Colombo, P., P. Santi, R. Bettini, C.S. Brazel, and N.A. Peppas, "Drug Release from Swelling-Controlled Systems," in D.L. Wise et al., eds. Handbook of Pharmaceutical Controlled Release Technology, New York: Marcel Dekker, Inc. (2000) 183-210.
23. Brazel, C.S. "Biomedical Sensing by the use of Intelligent Polymers," in M. Schwartz, ed. Encyclopedia of Smart Materials, New York: John Wiley and Sons, July 2002, 95-111.
24. Huang, X. and C.S. Brazel, "On the Importance and Mechanisms of Burst Release in Controlled Drug Delivery- A Review," *J. Control. Rel.*, **73** (2001) 121-136.
25. Thornton, A.M. and C.S. Brazel, "Design of pH Sensitive Materials for On/Off Release of Thrombolytic and Anticoagulant Drugs," in S. Mallapragada, M. Tracy, B. Narasimhan, E. Mathiowitz, and R. Kormeyer, eds., Biomaterials for Drug Delivery and Tissue Engineering, Warrendale, PA: Materials Research Society, Pittsburgh, **662** (2001) MM2.6.1-MM2.6.6.
26. Huang, X. and C.S. Brazel, "Analysis of Burst Release of Proxiphylline from Poly(vinyl alcohol) Hydrogels," *Chemical Engineering Communications*, **190** (2003) 519-532.
27. Benton, M.G. and C.S. Brazel, "Effect of Room Temperature Ionic Liquids as Replacements for Volatile Organic Solvents in Free Radical Polymerization," in Rogers, R.D. and K.R. Seddon, eds., Ionic Liquids: Industrial Applications for Green Chemistry, Washington, DC: American Chemical Society Symposium Series **818** (2002) 125-133.
28. Stoltz, M.J. and C.S. Brazel, "Novel Dual Temperature Sensitive Materials Based on Interpenetrating Polyalkylacrylamide Networks for Temperature-Proportional Controlled Release," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **28** (2001) #0512.
29. Brazel, C.S. "Integrating Team Laboratory Experiments Into a Senior Biochemical Engineering Course," *Proceed. American Society for Engineering Education Annual Conference*, paper 194 (2002) 1-16.
30. Brazel, C.S., G.S. Maddox, M.F. Garcia, L.M. Savoy, M.G. Benton, and A.M. Thornton, "Fundamental Chemical Differences between Polyacidic and Polybasic Materials for the Design of pH-Responsive Systems," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **29** (2002) #007
31. Huang, X. and C.S. Brazel, "Understanding the Burst Effect: Release in PVA Hydrogel Systems, Improvements in Modeling, and Approaches to Preventing Burst," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **29** (2002) #236
32. Hong, K., H. Zhang, J.W. Mays, A.E. Visser, C.S. Brazel, J.D. Holbrey, W.M. Reichert, and R.D. Rogers, "Conventional Free Radical Polymerization in Room Temperature Ionic Liquids: A Green Approach to Commodity Polymers with Practical Advantages," *Chem. Comm.*, **2002** (2002) 1368-1369.
33. Huang, X., B.L. Chestang, and C.S. Brazel, "Minimization of Initial Burst in Poly(vinyl alcohol) Hydrogels by Surface Extraction and Surface-Preferential Crosslinking," *Int. J. Pharm.* **248** (2002) 183-192.

Research Publications (cont'd)

34. Stoltz, M.J. and C.S. Brazel, "Dual-LCST Polymer Networks Based on Block, Laminate, and Interpenetrating Network Structures Composed of N-Alkylacrylamides, and N,N-Dialkylaminoethyl Methacrylates," *J. Appl. Polym. Sci.*, **88** (2003) 2974-2981.
35. Scott, M.P., C.S. Brazel, M.G. Benton, J.W. Mays, J. D. Holbrey, and R.D. Rogers, "Application of Ionic Liquids as Plasticizers for Poly(methyl methacrylate)," *Chem. Comm.*, **2002** (2002) 1370-1371.
36. Brazel, C.S. and X. Huang, "The Cost of Optimal Drug Delivery: Reducing and Preventing the Burst Effect in Matrix Systems," Svenson, S., ed. Carrier-Based Drug Delivery, ACS Symposium Series, Washington, DC: American Chemical Society **879** (2004) 267-282.
37. Brazel, C.S., A.N. Roberts, and X. Huang, "Surface-Preferential Crosslinking in Hydrogels to Minimize The Burst Effect and Design Tunable Lag Times for Drug Delivery," *IEEE Trans. Biomed. Eng.*, **2** (2002) 496-497.
38. Scott, M.P., M.G. Benton, M. Rahman, and C.S. Brazel, "Plasticizing Effects of Imidazolium Salts in PMMA: High Temperature Stable Flexible Engineering Materials," in Rogers, R.D., and K.R. Seddon, eds. Ionic Liquids as Green Solvents: Progress and Prospects, Washington, DC: American Chemical Society Symposium Series, **856** (2003) 468-477.
39. Benton, M.G. and C.S. Brazel, "Comparison of Kinetics For Solution Polymerization of Poly(methyl methacrylate) in Green Ionic Liquid Solvents Versus Traditional Volatile Solvents," *Polym. Prepr.* **43** (2002) 881-882.
40. Scott, M.P., M. Rahman and C.S. Brazel, "Application of Ionic Liquids as Low Volatility Plasticizers for PMMA," *Eur. Polym. J.* **39** (2003) 1947-1953.
41. Benton, M.G. and C.S. Brazel, "An Investigation of the Degree and Rate of Polymerization of Poly(methyl methacrylate) in the Ionic Liquid 1-Butyl-3-Methylimidazolium Hexafluorophosphate," *Polymer International* **53** (2004) 1113-1117.
42. Brazel, C.S. "Book Review: Polymeric Drugs and Drug Delivery Systems," *J. Control. Rel.*, **89** (2003) 143.
43. Carroll, K.S., J.B. McKinney, D.T. Johnson and C.S. Brazel, "Development of Magnetothermal Responsive Systems for Tumor Treatment," *Proceed. Intern. Symp. Control. Rel. Bioact. Mater.*, **30** (2003), #082.
44. Rahman, M., M.G. Benton, M.P. Scott and C.S. Brazel, "Room Temperature Ionic Liquids as Environmentally Benign Plasticizers and Reaction Media for Polymerization Reactions," *Proceed. Green Chem. Eng. Conf.* **7** (2003) 180-183.
45. Brazel, C.S., D.W. Arnold, G.C. April, A.M. Lane, J.M. Wiest, "Chemical Engineering at The University of Alabama," *Chemical Engineering Education* **38** (2004) 8-13.
46. Rahman, M. and C.S. Brazel, "Effectiveness of Phosphonium, Ammonium, and Imidazolium-Based Ionic Liquids as Plasticizers for Poly(vinyl chloride): Thermal and Ultraviolet Stability," *Polym. Prepr.* **45-1** (2004) 301-302.
47. Shoff, H.W., M. Rahman, and C.S. Brazel, "Leaching and Migration Resistance of Phosphonium-Based Ionic Liquids as PVC Plasticizers: A Comparative Study of Traditional Phthalate and Citrate Plasticizers with Ionic Liquids," *Polym. Prepr.* **45-1** (2004) 295-296.
48. Rahman, M. and C.S. Brazel, "Review: An Assessment of Traditional Plasticizers and Research Trends for Development of Novel Plasticizers," *Prog. Polym. Sci.*, **29** (2004), 1223-1248.
49. Rahman, M., H.W. Shoff and C.S. Brazel, "Ionic Liquids as Alternative Plasticizers for PVC: Flexibility and Stability in Thermal, Leaching and Ultraviolet Environments," in Brazel, C.S. and R.D. Rogers, eds. Ionic Liquids in Polymer Systems: Solvents, Additives, and Novel Applications, Washington, D.C.: American Chemical Society Symposium Series, **913** (2005), 103-118.

Research Publications (cont'd)

50. Brazel, C.S. and R.D. Rogers, "Preface: Ionic Liquids in Polymer Systems," in Brazel, C.S. and R.D. Rogers, eds. Ionic Liquids in Polymer Systems: Solvents, Additives, and Novel Applications, Washington, D.C.: American Chemical Society Symposium Series, **913** (2005) ix-x.
51. Brazel, C.S., "Review of Reflexive Polymers & Hydrogels: Understanding and Designing Fast Responsive Polymeric Systems by N. Yui, R.J. Mrsny, and K. Park, Boca Raton, FL: CRC Press" *J.ACS*, **127** (2005) 1590.
52. Saini, V., V.P. Zharov, C.S. Brazel, D.E. Nikles, D.T. Johnson and M. Everts, "Combination of Viral Biology and Nanotechnology: New Applications in Nanomedicine," *Nanomedicine: Nanotechnology, Biology and Medicine* **2** (2006) 200-206.
53. Rahman, M. and C.S. Brazel, "Ionic Liquids: New Generation Stable Plasticizers for Poly(vinyl chloride)," *Polymer Degradation and Stability* **91** (2006) 3371-3382.
54. Brazel, C.S., P.E. Clark, T.M. Klein, A.M. Lane, and S.M.C. Ritchie, "Renovation and Upgrades of Chemical and Biological Engineering Unit Operations Lab to Teach Technical Skills in Emerging Engineering Fields," ASEE-Southeast Regional Meeting (2006), paper # 37.
55. Wu, L.F. and C.S. Brazel, "Extending Surface Crosslinking Technique to Prevent the Burst Effect to Controlled Release Systems Based on Poly(vinyl alcohol), Poly(2-hydroxyethyl methacrylate), and Gelatin," *Control. Rel. Soc. Trans.*, **33** (2006), #234.
56. Brazel, C.S., I. Ankareddi, M.L. Hampel, H. Bagaria, D.T. Johnson, and D.E. Nikles, "Development of Magnetothermal-Responsive Delivery Systems Using FePt Nanoparticles Imbedded in Poly(N-isopropylacrylamide)-Based Hydrogels," *Control. Rel. Soc. Trans.*, **33** (2006), #762.
57. Ankareddi, I. and C.S. Brazel, "Synthesis and Characterization of Grafted Thermosensitive Hydrogels for Heating Activated Controlled Release," *Int. J. Pharm.*, **336** (2007) 241-247.
58. Ankareddi, I., M.L. Hampel, M.K. Sewell, D.-H. Kim, and C.S. Brazel, "Temperature Controlled Grafted Polymer Network Incorporated with Magnetic Nanoparticles to Control Drug Release Induced by an External Magnetothermal Trigger", *NSTI Nanotech 2* (2007) 431-434.
59. Wu, L. and C.S. Brazel, "Modifying the release of proxyphylline from PVA hydrogels using surface crosslinking," *Int. J. Pharm.* **349** (2008) 144-151.
60. Wu, L. and C.S. Brazel, "Surface Crosslinking for delayed release of proxyphylline from PHEMA hydrogels," *Int. J. Pharm.* **349** (2008) 1-10.
61. Kim, D.H., D.E. Nikles, D.T. Johnson and C.S. Brazel, "Investigation of Hyperthermia Response of Cobalt Ferrite Nanoparticles to an Alternating Current Magnetic Field," *J. Magn. Magn. Matls.* (2008) *in press*.
62. Ankareddi, I., A. Ponta, A. Shamsuzzoha, and C.S. Brazel, "Positive thermoresponsive grafted hydrogels for heating-activated drug delivery ," *PMSE Preprints* **98** (2008) 759-760.
63. Kim, D.-H., I. Ankareddi, D.E. Nikles and C.S. Brazel, "Synthesis and Characterization of Multifunctional Chitosan-coated MnFe₂O₄ for Magnetic Hyperthermia," *PMSE Preprints* **98** (2008) 296-298.
64. Rahman, M. and C.S. Brazel, "Advances in Plasticizers: Using Ionic Liquids in PMMA and PVC Systems- a Combined Experimental and Thermodynamic Modeling Approach," *PMSE Preprints* **98** (2008) 788-789.
65. Sewell, M.K., K.D. Fugit, I. Ankareddi, C. Zhang, M.L. Hampel, D.-H. Kim and C.S. Brazel, "Magnetothermally-Triggered Drug Delivery Using Hydrogels with Imbedded Cobalt Ferrite, Iron Platinum or Manganese Ferrite Nanoparticles," *PMSE Preprints* **98** (2008) 694-695.
66. Ankareddi, I., M.M. Bailey, C.S. Brazel, J.F. Rasco, and R.D. Hood, "Developmental Toxicity Assessment of Thermoresponsive Poly(N-isopropylacrylamide-co-acrylamide) Oligomers in CD-1 Mice" *Birth Defects Research B* **783** (2008) 112-116.
67. Wu, L. and C.S. Brazel, "A Mathematical Model to Predict Drug Release, including the Early-Time Burst Effect, from Swellable Homogeneous Hydrogels," *Industrial and Engineering Chemistry Research* **47** (2008) 1518-1526.

Research Publications in Preparation

68. Wu, L. and C.S. Brazel, "Theoretical Verification of Surface Crosslinking as an Effective Method to Reduce Initial Burst Release from Swellable Hydrogels," submitted to *Industrial and Engineering Chemistry Research*, 2008, in review.
69. Kim, D.-H. and C.S. Brazel, "Synthesis and Characterization of Multifunctional Chitosan-MnFe₂O₄ Nanoparticles for Magnetic Hyperthermia Including Heating, Drug Delivery and Imaging," to be submitted to *IEEE Trans. Biomedical Engineering*, 2008.
70. Zhang, C., D.T. Johnson and C.S. Brazel, "Theoretical Study on the Multi-Region Bio-heat Equation to Model Magnetic Fluid Hyperthermia (MFH) using Low Curie Temperature Nanoparticles," submitted to *IEEE Trans. Nanobioscience*, 2008, in review.
71. Davis, Jr., J.H., C.S. Brazel, M. Rahman, "Docusate-Based Ionic Liquids: Synthesis and Potential Applications," *Chem. Comm.*, 2007, in preparation.
72. Sewell, M.K., I. Ankareddi, M.L. Hampel, J.B. McKinney, D.T. Johnson, D.E. Nikles and C.S. Brazel, "Magnetic Nanoparticles Dispersed in Hydrogels: Applications in Controlled Drug Delivery," in preparation, to be submitted to the *Journal of Controlled Release*.
73. Brazel, C.S., A.M. Thornton and X. Huang, "Dependence of Burst Release on pH of Medium for Release of Streptokinase from Poly(diethylaminoethyl methacrylate-co-2-hydroxyethyl methacrylate) Hydrogels," in preparation, to be submitted to *J. Biomed. Mater. Res.*
74. Brazel, C.S., A.M. Thornton, M. Garcia, M.G. Benton and M.J. Stoltz, "Unique Solution Behavior of Hydrogels based on Diethylaminoethyl Methacrylate," in preparation, to be submitted to *Polymer*.
75. Kim, D.-H., Y. Thai, D.E. Nikles and C.S. Brazel, "Optimized Heat Generation of MnFe₂O₄ Nanoparticles for Magnetic Hyperthermia using Multifunctional Nanoparticles," to be submitted to *J. Magn. Magn. Matls.*, 2008.
76. Ankareddi, I., A. Ponta, C.S. Brazel, "Grafted Thermoresponsive Hydrogels: Analysis of Structure and Diffusion for Heating-Activated Controlled Release," in preparation, to be submitted to *J. Applied Polymer Science*.
77. Zhang, C. and C.S. Brazel, "Modeling Hyperthermia Treatment with Different Sized Magnetic Nanoparticles," in preparation, to be submitted to *Int. J. Hyperthermia*.
78. Fugit, K.D. and C.S. Brazel, "Fluorescently-Tagged Magnetic Nanoparticles for Tracking in Cell Culture," in preparation, to be submitted to *Nanobioscience*.

Student Publications (through UA's *Journal of Science and Health at UA*)

1. Y.T. Thai, D.-H. Kim, C.S. Brazel, "Heat Generation in Manganese Ferrite (MnFe₂O₄) Nanoparticles for Localized Hyperthermia Treatment of Cancer," *Journal of Science and Health at the University of Alabama (JOSHUA)*, 2008.
2. M.K. Sewell and C.S. Brazel, "Improving Cancer Therapy: Triggering Chemotherapy Using Temperature Responsive Polymers," *Journal of Science and Health at the University of Alabama (JOSHUA)*, 2008.