RAFAEL VERDUZCO

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Education

CALIFORNIA INSTITUTE OF TECHNOLOGY
Doctor of Philosophy 9/2001 – 2/2007
Thesis: "Self-assembled Liquid Crystal Gels"
Advisor: Julia A. Kornfield

CALIFORNIA INSTITUTE OF TECHNOLOGY
Master of Science 9/2001 – 5/2003

RICE UNIVERSITY
B.S. Chemical Engineering 9/1997 – 5/2001
Graduated summa cum laude, with a focus in computational mathematics

Professional Career

RICE UNIVERSITY
Department of Chemical and Biomolecular Engineering
Louis Owen Assistant Professor 7/2009 - present

CENTER FOR NANOPHASE MATERIALS SCIENCES
DOE user facility at Oak Ridge National Laboratory
Postdoctoral Research Associate 3/2007 – 6/2009
Supervisors: Philip F. Britt and S. Michael Kilbey, II

CALIFORNIA INSTITUTE OF TECHNOLOGY
Graduate Student in Chemical Engineering 9/2001 – 2/2007
Advisor: Julia A. Kornfield

POHANG INSTITUTE OF TECHNOLOGY
East Asia and Pacific Summer Institutes Fellowship 6/2004 – 9/2004
Project: Control of morphology in block copolymer thin films
Advisor: Professor Jin Kon Kim

Publications

Verduzco, R., Botiz, I., Pickel, D., Hong, K., Kilbey, S. M., Darling, S. D. "Polythiophene-block-Polyfluorene and Polythiophene-block-Poly(fluorene-co-benzothiadiazole): insights into the

self-assembly of all-conjugated block copolymers," *accepted for publication in Macromolecules*, 2010.

Verduzco, R., Hong, S., Harden, J., Chambers, M., Luchette, P., Palffy-Muhoray, P., Sprunt, S., Gleeson, J. T., Jákli, A. "Bent Core Liquid Crystal Single Crystal Elastomers," *J. Mater. Chem.*, **20**, 8488 (2010).
http://pubs.rsc.org.ezproxy.rice.edu/en/Content/ArticleLanding/2010/JM/C0JM01920H

Hong, S., **Verduzco, R.**, Williams, J.,Twieg, R., DiMasi, E., Pindak, R., Jakli, A., Gleeson, J., and Sprunt, S. "Short range smectic order in bent-core nematic liquid crystals," *Soft Matter,* **6**, 4819 (2010).
http://pubs.rsc.org.ezproxy.rice.edu/en/Content/ArticleLanding/2010/SM/C000362J

Harden, Chambers, Verduzco, Luchette, Gleeson, Sprunt, Jakli. "Giant flexoelectricity in bent-core nematic liquid crystal elastomers," *Appl. Phys. Lett* **96**, 102907 (2010).
http://apl.aip.org/applab/v96/i10/p102907_s1

Bailey, C., Fodor-Csorba, F., **Verduzco, R.**, Sprunt, S., Gleeson, J. J., Jákli, A.. "Large flow-birefringence of nematogenic bent-core liquid crystals," *Phys Rev Lett,* **103**, 237803 (2009)
http://scitation.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=PRLTAO00010300002323780300000 1&idtype=cvips&gifs=yes.

Lokitz, B., Messman, J., Hinestrosa, J. P., Alonzo, J., **Verduzco, R**., Brown, R. H., Osa, M., Ankner, J. F., Kilbey, M.. "Dilute Solution Properties and Surface Attachment of RAFT Polymerized 2-Vinyl-4,4-dimethyl Azlactone (VDMA)," *Macromolecules* 42, 9018, 2009.
http://pubs.acs.org/doi/full/10.1021/ma9015399

Chambers, M. **Verduzco, R.** Gleeson, J. T. Sprunt, S., and Jákli, A. "Flexoelectricity of a calamitic liquid crystal elastomer swollen with a bent-core liquid crystal." *J. Mater. Chem*. **19**, 7909-7913, (2009)
http://www.rsc.org.ezproxy.rice.edu/Publishing/Journals/JM/article.asp?doi=b911652d

Chambers, M., **Verduzco, R.**, Gleeson, J. T., Sprunt, S., and Jákli, A. "Calamitic liquid crystalline elastomers swollen in bent-core liquid crystal solvents." *Advanced Materials* **21**, 1, (2009). http://www3.interscience.wiley.com/journal/121670303/abstract

Scruggs, N. R., **Verduzco, R.**, Uhrig, D, Kahn, W., Park, S. Y., Lal, J., Kornfield, J. A. "Self-Assembly of Coil / Liquid-Crystalline Diblock Copolymers in a Liquid Crystal Solvent." *Macromolecules* **42**, 299, (2009)
http://pubs.acs.org/doi/abs/10.1021/ma801598y?prevSearch=Verduzco&searchHistoryKey

Li, T., Hong, K., Porcar, L., **Verduzco, R.**, Butler, P. D., Smith, G. S., Liu, Y., and Chen. W.-R. "Assessing the Intra-molecular Cavity of a PAMAM Dendrimer in Aqueous Solution by Small Angle Neutron Scattering." *Macromolecules*, **41**, 8916, (2008).
http://pubs.acs.org/doi/abs/10.1021/ma801555j?prevSearch=Verduzco&searchHistoryKey=

Porcar, L., Liu, Y., Hong, K., **Verduzco, R.**, Butler, P. D., Magid, L. H., Chen, W.-R. "Structural Investigation of PAMAM Dendrimers in Aqueous Solutions Using Small Angle Neutron Scattering: Effect of Generation." *J. Phys. Chem. B*, **112**, 14772, (2008). http://pubs.acs.org/doi/abs/10.1021/jp805297a?prevSearch=Verduzco&searchHistoryKey=

Xia, Y., **Verduzco, R.**, Grubbs, R. H., Kornfield, J. A. "Well-Defined Liquid Crystal Gels from Telechelic Polymers." *Journal of the American Chemical Society* **130**, 1735, (2008). http://pubs.acs.org/doi/abs/10.1021/ja077192j?prevSearch=Kornfield%2Band%2BXia&searchHistoryKey=

Verduzco, R., Scruggs, N. R., Sprunt, S., Palffy-Muhoray, P., Kornfield, J. A. "Director dynamics in liquid-crystal physical gels." *Soft Matter,* **3**, 993, (2007). http://www.rsc.org.ezproxy.rice.edu/Publishing/Journals/SM/article.asp?doi=b700871f

Verduzco, R., Meng, G., Kornfield, J. A., and Meyer, R. B. "Buckling Instability in Liquid Crystalline Gels" *Physical Review Letters,* **96**, 147802 (2006). http://scitation.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=PRLTAO00009600001414780200001&idtype=cvips&gifs=yes

Kempe, M.D., **Verduzco R.**, and Neal R. S. and Kornfield, J.A. "Rheological study of structural transitions in triblock copolymers in a liquid crystal solvent" *Soft Matter*, **2**, 422 (2006). http://www.rsc.org.ezproxy.rice.edu/Publishing/Journals/SM/article.asp?doi=b600483k

Kempe, M. D., Scruggs, N. R, **Verduzco, R**., Lal, and J., Kornfield, J. A. "Self-Assembled liquid crystalline gels designed from the bottom up." *Nature Materials*, **3,** 182, (2004). http://www.nature.com/nmat/journal/v3/n3/abs/nmat1074.html

Professional Service

Member: American Institute of Chemical Engineers, American Physical Society, American Chemical Society
Proposal Review: Basic Energy Sciences division of the Department of Energy, Argonne National Laboratory's Center for Nanoscale Materials Proposal Evaluation Board, NSF CBET Energy for Sustainability, NSF CBET Interfacial Processes and Thermodynamics
Journal Review: Materials Today, Journal of Polymer Science Part B: Polymer Physics, Journal of Applied Polymer Science
Conference Organization: Session Chair for "Structure and Properties of Polymers I," "Polymer Processing and Rheology II," and "Polymeric Materials for Energy Conversion."
Committees: Rice Center for Engineering Leadership (RCEL) advisory board member, Member of the Undergraduate Studies Committee and Graduate Recruiting Committee in the Department Chemical and Biomolecular Engineering

Honors and Awards

Louis Owen Assistant Professor, 2009 - present
East Asia and Pacific Summer Institutes Fellowship, 2004
National Defense Science and Engineering Graduate Fellowship, 2001 - 2004
James-Irvine Graduate Fellow, 2001 – 2004
Graduated summa cum laude
Roy Honors Scholarship, 1997

Presentations

- "Synthesis and Thin Film Morphology of Rod-Rod Polythiophene-block-Polyfluorene Conjugated Copolymers" American Institute of Chemical Engineering annual meeting, November 2010
- "Clustering in Nematic Bent Core LCs and LC Polymers" American Physical Society annual meeting, March 2010
- "Bent Core Liquid Crystal Elastomers," International Liquid Crystal Elastomer Conference, 2009
- "Bent-Core Liquid Crystals and Liquid Crystal Elastomers," Annual Meeting of the American Institute of Chemical Engineers 2009
- "Neutron and X-Ray Scattering Studies of Structured Fluids: Bent-Core Liquid Crystals and PAMAM Dendrimers" invited talk, Case Western Reserve University, April 2009
- "Investigation of PAMAM in solution by Neutron Scattering" invited talk, Tennessee Technological University, Department of Chemical Engineering, 2008
- "Self-Assembled Liquid Crystal Gels," invited talk, Kent State University, Liquid Crystal Institute, 2007
- "Self-Assembled Liquid Crystal Gels," invited talk, University of Leeds, Polymers and Complex Fluids, 2007
- "Dynamics of Self-Assembled Liquid Crystal gels," Annual Meeting of the American Institute of Chemical Engineers, 2006
- "Rheological Characterization of Self-Assembled Liquid Crystal Gels," American Chemical society, 2006
- "Buckling instability in liquid crystalline gels," American Physical Society, 2005 Canada-America-Mexico Physics Graduate Student Conference
- "Self-assembled liquid crystal gels," Polymer Processing Society, Asia/Australia 2004 regional meeting
- "Self-assembled liquid crystal gels," International Conference on Rheology, 2004 national meeting
- "Synthesis of self-assembled liquid crystal gels," American Institute of Chemical Engineers, 2003 national meeting
- "Self-assembled liquid crystalline gels designed from the bottom up," Materials Research Society, 2003 national meeting

Teaching and Broader Impact

- Instructor for CHBE\MSCI 594: Properties of Polymers and CHBE 411: Thermodynamics I
- Mentor for the 2010 Undergraduate Summer Research Experience in collaboration with the West Houston Center for Science and Engineering at Houston Community College
- Mentor for Rice's Community and Mentoring Program for Undergraduate Success (CAMPUS)