

## Ken D. Shimizu (updated 12/1/2014)

**Professor**  
**Department of Chemistry and Biochemistry**  
**University of South Carolina**  
**Columbia, SC 29208**

**RESEARCH INTERESTS:** Supramolecular Chemistry, Molecular Recognition, Physical Organic Chemistry, Molecularly Imprinted Polymers, Materials Chemistry

### 1. PROFESSIONAL EXPERIENCE

#### Appointments

<u>Dates</u>	<u>Title</u>	<u>Institution</u>	<u>Department</u>
1997-2003	Assistant Professor	University of South Carolina	Chemistry
2003-2010	Associate Professor	University of South Carolina	Chemistry
2010-present	Professor	University of South Carolina	Chemistry

### 2. EDUCATION

<u>Institution</u>	<u>Major / Area</u>	<u>Degree &amp; Year</u>
<b>Cornell University</b>	Chemistry	B.A.: 1990
<b>Massachusetts Institute of Technology</b>	Chemistry	Ph.D.: 1995
<b>Boston College</b>	Chemistry	NIH Postdoc Fellow: 1995-1997

### 2. HONORS AND AWARDS:

SERMACS Symposium Organizer: "Supramolecular Chemistry"	2013
Session Chair for Mesilla Workshop on Aromatic Interactions	2011
Editorial Advisory Board: Journal of Molecular Imprinting	2011 - present
Co-organizer of 6 <sup>th</sup> International Molecular Imprinting Conference	2010
Editorial Board Organic Chemistry International	2008 - present
Editorial Advisory Board: Journal of Molecular Recognition	2008 - present
Mungo Undergraduate Teaching Award	2008
Organized SERMACS session on Functional polymers and biomacromolecules	2006
Japan Society for the Promotion of Science (JSPS) Fellowship	2004
Mortar Board Excellence in Teaching Award	2001
Research Corporation Research Innovation Award	1997
NIH Postdoctoral Fellowship	1995-1997
CRC Award for Achievement in Organic Chemistry	1987

### 4. RESEARCH HIGHLIGHTS

Paper on "Proton Grease" highlighted in <i>RSC Chemistry World</i>	2012
Article on cover of <i>Current Opinion in Chemical Biology</i> vol 14	2010
Interviewed and quoted in <i>Technology Review</i> magazine (June)	2010
Paper ( <i>Org. Lett.</i> , <b>2009</b> , 11, 2599) highlighted in <i>ACS Noteworthy</i> column Aug	2009
Paper ( <i>J. Am. Chem. Soc.</i> , <b>2009</b> , 131, 12062) highlighted in <i>Chem. &amp; Eng. News</i> , 87(35)	2009
Paper ( <i>Org. Lett.</i> , <b>2008</b> , 10, 3547) highlighted in <i>Nature Chem. Aug. 1</i>	2008

Interviewed and quoted in <i>Technology Review</i> magazine (Oct.)	2008
Paper ( <i>Chem. Comm.</i> , <b>2007</b> , 3, 228) highlighted in <i>MRS Bulletin</i> , 32, 302	2007
Paper ( <i>Chem. Comm.</i> <b>2004</b> , 10, 1172) among 10 most downloaded articles	2004
Paper ( <i>Chem. Comm.</i> <b>2004</b> , 10, 1172) highlighted in <i>ACS Heartcut</i> , June	2004
ACS meeting presentation highlighted in <i>Chem. &amp; Eng. News</i> , 80(23), 51	2002
Presentation highlighted in <i>MRS Bulletin</i> , 27, 563	2002
Cover article of <i>Analyst</i> vol 125	2000

## 5. SYNERGISTIC ACTIVITIES

- Research Advisor for 16 Ph.D. graduate students
- Research Advisor for 7 M.S. graduate students
- Research Advisor for 8 high school students in research activities
- Research Advisor for 29 undergraduate students
- Deutsche Forschungsgemeinschaft (DFG) review panel (2014)
- NSF MSN review panel (2014)
- NSF MSN review panel (2011)
- NSF CBET review panel (2011)
- NSF CBET review panel (2008)
- NSF CBET review panel (2007)
- NSF SBIR review panel (2007)
- NIH SBICA study section 2006
- NIH BCMBIRG study section 2006
- Faculty mentor for High School lab experience ScienceLab (2008 – present)
- Mentor / research director for 5 Undergraduates in NSF Research Experiences for Undergraduates (REU) Program in Nanoscience.
- Mentor / thesis advisor for the University of South Carolina Honors College.
- Faculty advisor for local South Carolina American Chemical Society Chapter (SACS)

## 6. RESEARCH FUNDING (PI AWARDS)

- **NSF**, “Molecular balance for measuring molecular-level anion effects on amino acids” **\$390,000**, 9/2013 to 09/2016
- **EPSCoR**, “Collaborative Research Program (CRP): Colorimetric molecular sensors for monitoring stress and strain in synthetic blood vessels” **\$100,000**, 01/2013 to 06/2014
- **NSF**, “Programmable polymers based on restricted rotation” **\$390,000**, 10/01/2011 to 09/30/2014
- **NSF**, “US Egypt Cooperative Research: Luminescent Molecularly Imprinted Polymer Sensor Arrays” PI, **\$125,000**, 8/01/2011 to 7/31/2014
- **NSF**, “A molecular balance for studying the non-covalent interactions of aromatic surfaces” PI, **\$460,000**, 8/01/2009 to 7/31/2013.
- **NSF**, “New Strategies for Improved Molecularly Imprinted Polymers”, **\$250,000**, 8/15/08 to 8/14/11
- **NIH**, “New Strategies for Improved Imprinted Polymers”, **\$1,128,906**, 3/01-3/07
- **PRF**, “New Model Systems to Measure Weak Non-covalent Interactions”, **\$90,000**, 09/01/07 to 08/3/09
- **NSF**, “Conformationally Programmable Molecular Receptors”, **\$420,000**, 08/06 to 06/09

- NSF, “Conformationally Programmable Molecular Receptors”, **\$399,000**, 07/15/03 to 07/14/06
- NSF, “Synthetic Self-Assembling Polyimides”, **\$370,002**, 9/01/98 – 8/31/03.

## 7. PUBLICATIONS (H-INDEX 28)

1. P. Li, T. M. Parker, J. Hwang, F. Deng, M. D. Smith, P. J. Pellechia, C. D. Sherrill, K. D. Shimizu. “*The CH- $\pi$  Interactions of Methyl Ethers as a Model for Carbohydrate-N-Heteroarene Interactions.*” *Org. Lett.*, **2014**, 5064-5067.
2. M. J. Maher, K. Yehl, F. Haque, A. Faint, K. D. Shimizu, C. J. Stephenson. “*Surprising variations in the rate of ring opening for a series of rhodamine lactams with similar equilibrium endpoints.*” *Sens. Actuators, B Sensors and Actuators, B: Chemical*, **2014**, 200, 1-8.
3. C. Zhao, P. Li, M. D. Smith, P. J. Pellechia, K. D. Shimizu. “*Experimental Study of the Cooperativity of CH- $\pi$  Interactions.*” *Org. Lett.*, **2014**, 16, 3520-3523.
4. D. Song, Y. Zhang, M. F. Geer, K. D. Shimizu. “*Characterization of molecularly imprinted polymers using a new polar solvent titration method.*” *J. Mol. Recognit.*, **2014**, 27, 448-457.
5. J. Hwang, P. Li, W. R. Carroll, P. J. Pellechia, K. D. Shimizu. “*Additivity of substituent effects in aromatic stacking interactions.*” *J. Am. Chem. Soc.*, **2014**, 136, 14060–14067
6. K. D. Shimizu. “*Intermolecular forces: A solution to dispersion interactions.*” *Nat Chem*, **2013**, 5, 989-990. **(Invited commentary)**
7. P. Li, C. Zhao, M. D. Smith, K. D. Shimizu. “*Comprehensive Experimental Study of N-Heterocyclic  $\pi$ -Stacking Interactions of Neutral and Cationic Pyridines.*” *J. Org. Chem.*, **2013**, 78, 5303-5313.
8. B. E. Dial, P. J. Pellechia, M. D. Smith, K. D. Shimizu. “*Proton Grease: An Acid Accelerated Molecular Rotor*” *J. Am. Chem. Soc.*, **2012**, 134, 3675-3678.
9. R. D. Rasberry, K. D. Shimizu. “*Molecular Machines*” in eds. J. L. Atwood, J. W. Steed, Taylor & Francis, **2012**, *Encyclopedia of Supramolecular Chemistry*
10. C. Zhao, R. M. Parrish, M. D. Smith, P. J. Pellechia, C. D. Sherrill, K. D. Shimizu. “*Do Deuteriums Form Stronger CH- $\pi$  Interactions?*” *J. Am. Chem. Soc.*, **2012**, 134, 14306-14309.
11. L. X. Ren, J. Y. Zhang, X. L. Bai, C. G. Hardy, K. D. Shimizu, C. B. Tang. “*Preparation of cationic cobaltocenium polymers and block copolymers by “living” ring-opening metathesis polymerization*” *Chem Sci*, **2012**, 3, 580-583.
12. Y. S. Chong, B. E. Dial, W. G. Burns, K. D. Shimizu. “*Covalent locking and unlocking of an atropisomeric molecular switch*” *Chem. Commun.*, **2012**, 48, 1296-1298.
13. Y. Zhang, K. D. Shimizu. “*Molecular imprinting and sensor development*” in *Chemosensors: Principles, Strategies, and Applications*, eds. B. Wang, E. V. Anslyn, John Wiley & Sons, Hoboken, New Jersey, **2011**, pp. 107-120.
14. W. R. Carroll, C. Zhao, M. D. Smith, P. J. Pellechia, K. D. Shimizu. “*A Molecular Balance for Measuring Aliphatic CH- $\pi$  Interactions.*” *Org. Lett.*, **2011**, 13, 4320-4323.

15. B. E. Dial, R. D. Rasberry, B. N. Bullock, M. D. Smith, P. J. Pellechia, S. Profeta, K. D. Shimizu. "Guest-Accelerated Molecular Rotor." *Org. Lett.*, **2011**, *13*, 244-247.
16. Y. G. Zhang, D. Song, J. C. Brown, K. D. Shimizu. "Suppression of background sites in molecularly imprinted polymers via urea-urea monomer aggregation" *Org. Biomol. Chem.*, **2011**, *9*, 120-126.
17. R. D. Rasberry, K. D. Shimizu. "Molecular Machines" in eds. Taylor & Francis, **2010**, *Encyclopedia of Supramolecular Chemistry*,
18. K. D. Shimizu, C. J. Stephenson. "Molecularly imprinted polymer sensor arrays" *Curr. Opin. Chem. Biol.*, **2010**, *14*, 743-750. **(Cover Article)**
19. Y. Zhang, D. Song, L. M. Lanni, K. D. Shimizu. "Importance of Functional Monomer Dimerization in the Molecular Imprinting Process." *Macromolecules*, **2010**, *43*, 6284-6294.
20. K. D. Shimizu. "Reading polymer codes." *Nat. Chem.*, **2010**, *2*, 612-613. **(Invited commentary)**
21. C. J. Stephenson, K. D. Shimizu. "A fluorescent diastereoselective molecular sensor for 1,2-aminoalcohols based on the rhodamine B lactone-zwitterion equilibrium" *Org. Biomol. Chem.*, **2010**, *8*, 1027-1032.
22. L. M. Hyman, C. J. Stephenson, M. G. Dickens, K. D. Shimizu, K. J. Franz. "Toward the development of prochelators as fluorescent probes of copper-mediated oxidative stress" *Dalton Trans.*, **2010**, *39*, 568-576.
23. Y. S. Chong, W. R. Carroll, W. G. Burns, M. D. Smith, K. D. Shimizu. "A High-Barrier Molecular Balance for Studying Face-to-Face Arene-Arene Interactions in the Solid State and in Solution" *Chem. Eur. J.*, **2009**, *15*, 9117-9126.
24. R. D. Rasberry, K. D. Shimizu. "Molecular playdough: conformationally programmable molecular receptors based on restricted rotation" *Org. Biomol. Chem.*, **2009**, *7*, 3899-3905.
25. Y. Zhang, J. M. Lavin, K. D. Shimizu. "Solvent Programmable Polymers Based on Restricted Rotation" *J. Am. Chem. Soc.*, **2009**, *131*, 12062-12063. **(Highlighted in Chem. & Eng. News, 2009, 87(35), 25-26.)**
26. R. D. Rasberry, X. Wu, B. N. Bullock, M. D. Smith, K. D. Shimizu. "A small molecule diacid with long-term chiral memory." *Org. Lett.*, **2009**, *11*, 2599-2602. **(Highlighted in ACS noteworthy column Aug 31, 2009)**
27. X. Wu, K. D. Shimizu. "Development of molecularly imprinted polymers as tailored templates for the solid-state [2+2] photodimerization" *Biosensors and Bioelectronics*, **2009**, *25*, 640-646.
28. X. G. Wu, K. Goswami, K. D. Shimizu. "Comparison of monofunctional and multifunctional monomers in phosphate binding molecularly imprinted polymers" *J. Mol. Recognit.*, **2008**, *21*, 410-418.
29. X. Wu, K. D. Shimizu. "Chapter 15. Molecular imprinting for sensor applications." in eds. V. M. Rotello, S. Thayumanavan, John Wiley & Sons, Hoboken, NJ, **2008**, *Molecular Recognition and Polymers*, pp. 395-429.
30. W. R. Carroll, P. Pellechia, K. D. Shimizu. "A Rigid Molecular Balance for Measuring Face-to-Face Arene-Arene Interactions" *Org. Lett.*, **2008**, *10*, 3547-3550. **(Highlighted in Nature Chem.**

**2008, Aug)**

31. X. Y. Wu, W. R. Carroll, K. D. Shimizu. "Stochastic lattice model Simulations of molecularly imprinted polymers" *Chem. Mater.*, **2008**, 20, 4335-4346.
32. R. D. Rasberry, M. D. Smith, K. D. Shimizu. "Origins of selectivity in a colorimetric charge-transfer sensor for diols" *Org. Lett.*, **2008**, 10, 2889-2892.
33. G. T. Rushton, W. G. Burns, J. M. Lavin, Y. S. Chong, P. Pellechia, K. D. Shimizu. "Determination of the rotational barrier for kinetically stable conformational isomers via NMR and 2D TLC - An introductory organic chemistry experiment" *J. Chem. Educ.*, **2007**, 84, 1499-1501.
34. C. J. Stephenson, K. D. Shimizu. "Colorimetric and fluorometric molecularly imprinted polymer sensors and binding assays" *Polym. Int.*, **2007**, 56, 482-488.
35. J. M. Lavin, K. D. Shimizu. "A supramolecular switch with molecular memory" *Chem. Commun.*, **2007**, 228-230. (**highlighted in *MRS Bulletin*, 2007, 32, 302**)
36. J. M. Lavin, K. D. Shimizu. "Rapid screening of a receptor with molecular memory." *Org. Lett.*, **2006**, 2389-2392.
37. K. D. Shimizu. "*Binding Isotherms*" in eds. M. Yan, O. Ramstrom, Marcel Dekker, New York, N. Y., **2005**, *Molecularly Imprinted Materials*, pp. 419-434.
38. J. D. Lee, N. T. Greene, G. T. Rushton, K. D. Shimizu, J. I. Hong. "Carbohydrate recognition by porphyrin-based molecularly imprinted polymers." *Org. Lett.*, **2005**, 7, 963-966.
39. G. T. Rushton, B. Furmanski, K. D. Shimizu. "Plastic Antibodies: Molecular Recognition with Imprinted Polymers. An Introductory Polymer Chemistry Laboratory Investigation" *J. Chem. Educ.*, **2005**, 82, 1374.
40. C. F. Degenhardt, J. M. Lavin, M. D. Smith, K. D. Shimizu. "Conformationally imprinted receptors: atropisomers with "write", "save", and "erase" recognition properties." *Org. Lett.*, **2005**, 7, 4079-4081.
41. K. D. Shimizu. "Post Modification of Imprinted Sites" in eds. M. Yan, O. Ramstrom, Marcel Dekker, New York, N. Y., **2005**, *Molecularly Imprinted Materials: Science and Technology*, pp. 329-345.
42. G. T. Rushton, C. L. Karns, K. D. Shimizu. "A critical examination of the use of the Freundlich isotherm in characterizing molecularly imprinted polymers (MLPs)" *Anal. Chim. Acta*, **2005**, 528, 107-113.
43. G. T. Rushton, K. D. Shimizu. "*Molecularly Imprinted Polymers*" in *Encyclopedia of Chemical Processing*, eds. L. Sunggyu, CRC Press, **2005**, pp. 1737-1746.
44. N. T. Greene, K. D. Shimizu. "Colorimetric molecularly imprinted polymer sensor array using dye displacement." *J. Am. Chem. Soc.*, **2005**, 127, 5695-5700.
45. N. T. Greene, S. L. Morgan, K. D. Shimizu. "*Molecularly imprinted polymer sensor arrays*" *Chem. Commun.*, **2004**, 10, 1172-1173.
46. H. L. Ricks, L. S. Shimizu, M. D. Smith, U. H. F. Bunz, K. D. Shimizu. "*An N,N'-diaryl urea based conjugated polymer model system*" *Tetrahedron Lett.*, **2004**, 45, 3229-3232.

47. M. Rampey, R. J. Umpleby, G. T. Rushton, J. C. Iseman, R. N. Shah, K. D. Shimizu. "Characterization of the imprint effect and the influence of imprinting conditions on affinity, capacity, and heterogeneity in molecularly imprinted polymers using the Freundlich isotherm-affinity distribution analysis" *Anal. Chem.*, **2004**, 76, 1123-1133.
48. D. L. Reger, D. M. C. Smith, K. D. Shimizu, M. D. Smith. "Syntheses and solid state structures of europium and terbium complexes of N,N'-bis(2-pyridylmethyl)urea and N,N'-bis(3-pyridylmethyl)oxalamide" *Polyhedron*, **2004**, 23, 711-717.
49. R. J. Umpleby, II, A. M. Rampey, S. C. Baxter, G. T. Rushton, R. N. Shah, J. C. Bradshaw, K. D. Shimizu. "Characterization of the heterogeneous binding site affinity distributions in molecularly imprinted polymers" *J. Chromatogr. B*, **2004**, 804, 141-149.
50. L. S. Shimizu, A. D. Hughes, M. D. Smith, M. J. Davis, B. P. Zhang, H. C. zur Loye, K. D. Shimizu. "Self-assembled nanotubes that reversibly bind acetic acid guests" *J. Am. Chem. Soc.*, **2003**, 125, 14972-14973.
51. Y. H. Li, C. Y. Su, A. M. Goforth, K. D. Shimizu, K. D. Gray, M. D. Smith, H. C. zur Loye. "The first 'two-over/two-under' (2O/2U) 2D weave structure assembled from Hg-containing 1D coordination polymer chains" *Chem. Commun.*, **2003**, 14, 1630-1631.
52. D. L. Reger, D. M. C. Smith, K. D. Shimizu, M. D. Smith. "N,N'-bis(2-pyridylmethyl)oxamidato palladium(II) monohydrate chloroform hemisolvate" *Acta Crystallogr., Sect. E*, **2003**, 59, M652-M654.
53. S. Shotwell, H. L. Ricks, J. G. M. Morton, M. Laskoski, J. Fiscus, M. D. Smith, K. D. Shimizu, H. C. zur Loye, U. H. F. Bunz. "Trans-spanning acetylenic bispyridine ligands: synthesis and structural characterization of novel organic and organometallic pseudodehydroannulenes" *J. Organomet. Chem.*, **2003**, 671, 43-51.
54. K. D. Shimizu. "Characterization of MIPs Using Heterogeneous Binding Models" in eds. K. J. Shea, M. Yan, M. J. Roberts, **2002**, "Molecularly Imprinted Materials-Sensors and Other Devices", MRS Symposium Proceeding(723), pp. 17-21.
55. S. S. Walse, K. D. Shimizu, J. L. Ferry. "Surface-catalyzed transformations of aqueous endosulfan" *Environ. Sci. Technol.*, **2002**, 36, 4846-4853.
56. Y. Chen, K. D. Shimizu. "Measurement of Enantiomeric Excess Using Molecularly Imprinted Polymers" *Org. Lett.*, **2002**, 4, 2937-2940.
57. Y. S. Chong, K. D. Shimizu. "Shape-Persistent and Shape-Adaptable Macrocycles Based on Restricted Rotation: Studies Toward Building 'Macromolecular Playdough'" *Synthesis*, **2002**, 9, 1239-1244.
58. C. F. Degenhardt, M. D. Smith, K. D. Shimizu. "A chiral 28-membered macrocycle with symmetry and structure similar to that of trans-cyclooctene" *Org. Lett.*, **2002**, 4, 723-726.
59. D.-S. Choi, Y. S. Chong, D. Whitehead, K. D. Shimizu. "Molecules with Shape Memory Based on Restricted Rotation" *Org. Lett.*, **2001**, 3, 3757-3760.
60. T. Takeuchi, T. Mukawa, J. Matsui, M. Higashi, K. D. Shimizu. "Molecularly imprinted polymers with metalloporphyrin-based molecular recognition sites coassembled with methacrylic acid" *Anal. Chem.*, **2001**, 73, 3869-3874.

61. R. J. Umpleby, II, S. C. Baxter, Y. Chen, R. N. Shah, K. D. Shimizu. "Characterization of Molecularly Imprinted Polymers with the Langmuir-Freundlich Isotherm" *Anal. Chem.*, **2001**, 73, 4584-4591.
62. L. S. Shimizu, M. D. Smith, A. D. Hughes, K. D. Shimizu. "Self-assembly of a bis-urea macrocycle into a columnar nanotube" *Chem. Commun.*, **2001**, 17, 1592-1593.
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64. R. J. Umpleby, S. C. Baxter, M. Bode, J. K. Berch, R. N. Shah, K. D. Shimizu. "Application of the Freundlich adsorption isotherm in the characterization of molecularly imprinted polymers" *Anal. Chim. Acta*, **2001**, 435, 35-42.
65. Y. S. Chong, M. D. Smith, K. D. Shimizu. "A Conformationally Programmable Ligand" *J. Am. Chem. Soc.*, **2001**, 123, 7463-7464.
66. Y. Z. Chen, M. D. Smith, K. D. Shimizu. "An axially chiral phosphine ligand based on restricted rotation in N-arylimides" *Tetrahedron Lett.*, **2001**, 42, 7185-7187.
67. R. J. Umpleby, G. T. Rushton, R. N. Shah, A. M. Rampey, J. C. Bradshaw, J. K. Berch, K. D. Shimizu. "Recognition Directed Site-Selective Chemical Modification of Molecularly Imprinted Polymers" *Macromolecules*, **2001**, 34, 8446-8452.
68. K. D. Shimizu, H. O. Freyer, R. D. Adams. "Synthesis, resolution and structure of axially chiral atropisomeric N-arylimides" *Tetrahedron Lett.*, **2000**, 41, 5431-5434.
69. R. J. Umpleby, II, M. Bode, K. D. Shimizu. "Measurement of the continuous distribution of binding sites in molecularly imprinted polymers" *Analyst*, **2000**, 125, 1261-1265. (Cover Article)
70. C. F. Degenhardt, D. B. Shortell, R. D. Adams, K. D. Shimizu. "Synthesis and structural characterization of adaptable shape-persistent building blocks" *Chem. Commun.*, **2000**, 929-930.
71. U. H. F. Bunz, V. Enkelmann, L. Kloppenburg, D. Jones, K. D. Shimizu, J. B. Claridge, H. C. zur Loye, G. Lieser. "Solid-state structures of phenyleneethynylenes: Comparison of monomers and polymers" *Chem. Mater.*, **1999**, 11, 1416-1424.
72. U. H. F. Bunz, G. Roidl, M. Altmann, V. Enkelmann, K. D. Shimizu. "Synthesis and structural characterization of novel organometallic dehydroannulenes with fused CpCo-cyclobutadiene and ferrocene units including a cyclic fullerene segment" *J. Am. Chem. Soc.*, **1999**, 121, 10719-10726.
73. K. D. Shimizu, M. L. Snapper, A. H. Hoveyda. "Chapter 39: Combinatorial Approaches" in eds. E. N. Jacobsen, A. Pfaltz, H. Yamamoto, Springer-Verlag, New York, **1999**, *Comprehensive Asymmetric Catalysis*, pp.
74. K. D. Shimizu, M. L. Snapper, A. H. Hoveyda. "High-throughput strategies for the discovery of catalysts" *Chem.-Eur. J.*, **1998**, 4, 1885-1889.
75. K. D. Shimizu, B. M. Cole, C. A. Krueger, K. W. Kuntz, M. L. Snapper, A. H. Hoveyda. "Search for chiral catalysts through ligand diversity: Substrate-specific catalysts and ligand screening on solid phase" *Angew. Chem., Int. Ed. Engl.*, **1997**, 36, 1703-1707.

76. K. D. Shimizu, J. Rebek. "A rigid trans-spanning dinitrile ligand" *Proc. Natl. Acad. Sci. U. S. A.*, **1996**, 93, 4257-4260.
77. B. C. Hamann, K. D. Shimizu, J. Rebek. "Reversible encapsulation of guest molecules calixarene dimer" *Angew. Chem., Int. Ed. Engl.*, **1996**, 35, 1326-1329.
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80. K. D. Shimizu, T. M. Dewey, J. J. Rebek. "Convergent functional groups. 15. Synthetic and structural studies of large and rigid molecular clefts" *J. Am. Chem. Soc.*, **1994**, 116, 5145-5149.
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82. H. Stover, S. Matuszczak, R. Chin, K. Shimizu, C. G. Willson, J. M. J. Fréchet. "Acid-Catalyzed Rearrangement of Aromatic Ethers: Model Studies and Application to Imaging." *Poly. Mat. Sci. Eng.*, **1989**, 61, 412-416.