第11回 分子システムデバイスセミナー

九州大学大学院 博士課程教育リーディングプログラム
分子システムデバイスコース
Advanced Graduate Course on Molecular Systems for Devices

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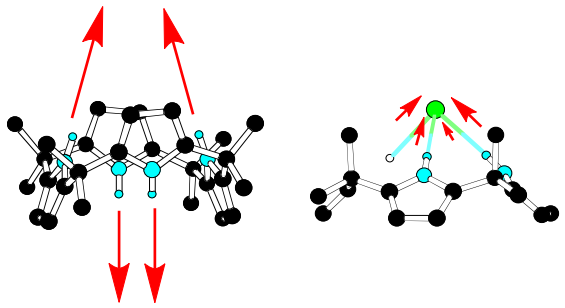
DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY,
THE UNIVERSITY OF TEXAS, AUSTIN

TIME AND DATE : Friday, 5th July, 2013, 17:30~ 18:30

VENUE : Ito campus, Open Learning Plaza, 1F Seminar room (110)

CALIXPYRROLES: FROM RECEPTORS AND SENSORS TO MOLECULAR SWITCHES AND SELF-ASSEMBLED MATERIALS

Pyrroles are found in several natural anion binding motifs. However, their use as artificial recognition motifs antedates an appreciation of their role in biological anion binding. The recognition that pyrrole-containing systems can bind anions dates back to 1990 and early work with expanded porphyrins. However, to date, expanded porphyrins have only proved useful for anion binding when studied in their protonated forms. An ongoing challenge has thus been to create neutral pyrrole-based anion recognition systems.



Concept of calix[4]pyrrole-based anion-triggered switching

Such a desire inspired the discovery of calix[n]pyrroles as anion binding agents. Calix[n]pyrroles are synthetic compounds containing four or more pyrrole or pyrrole-like heterocyclic subunits within their non-conjugated frameworks. Inspired by earlier studies of the venerable calix[4]pyrrole system discovered by Baeyer in the 18th century, the chemistry of calixpyrrole-type compounds has grown to include systems built up from bipyrrole, bis(pyrrolyl)benzene, biimidazole, and a number of other heterocyclic subunits. In this lecture calix[n]pyrroles will be discussed in the context of recent efforts to develop them as “tunable” systems that are capable of acting as anion-triggered “molecular switches”. This has made them useful as “logic gates” and as precursors for environmentally responsive, self-assembled materials.

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Short BIOGRAPHY

Prof. Jonathan L. Sessler was born in Urbana, Illinois, USA on May 20, 1956. He received a B.S. degree (with Highest Honors) in chemistry in 1977 from the University of California, Berkeley. He obtained a Ph.D. in organic chemistry from Stanford University in 1982 (supervisor: Professor James P. Collman). He was a NSF-CNRS and NSF-NATO Postdoctoral Fellow with Professor Jean-Marie Lehn at L'Université Louis Pasteur de Strasbourg, France. He was then a JSPS Visiting Scientist in Professor Tabushi's group in Kyoto, Japan. In September 1984 he accepted a position as Assistant Professor of Chemistry at the University of Texas at Austin, where he is currently the Roland K. Pettit Chair. Dr. Sessler has authored or coauthored over 550 research publications, written two books (with Dr. Steven J. Weghorn and Drs. Philip A. Gale and Won-Seob Cho, respectively), edited another book (with Drs. Susan Doctrow, Tom McMurry, and Stephen J. Lippard), and been an inventor of record on over 80 issued U.S. Patents. To date, Dr. Sessler's work has been featured on more than 30 journal or book covers. His current H-index factor is 77. Dr. Sessler is the Editor of *Supramolecular Chemistry*, an Associate Editor for *ChemComm*, and is a member of the editorial advisory boards of *J. Organic Chemistry* and *J. Incl. Phenom.* Dr. Sessler is a co-founder (with Dr. Richard A. Miller) of Pharmacyclics, Inc., a publicly traded company (pcyc; NASDQ) dedicated to developing new cancer therapies. In conjunction with Dr. Martin R. Johnson, Dr. Sessler co-founded a second company, Anionics, Inc., that is targeting various commercial opportunities of anion recognition chemistry. Dr. Sessler has served as the co-organizer of several international conferences in porphyrin, supramolecular, and macrocyclic chemistry and numerous ACS symposia. In addition to English, he speaks French, Spanish, German, and Hebrew reasonably well and can get by in Japanese. He is currently learning Korean.