Jonathan L. SESSLER, Pettit Centennial Chaired Professor

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Education

Ph. D. (June, 1982; Stanford University), B.Sc. (June 1977; University of California, Berkeley)

Academic Carrier

1982 (July) – 1984 (March): Post-doctoral fellow, Université Louis Pasteur de Strasbourg (supervisor: Prof. Jean-Marie Lehn)
1984 (March) – 1984 (August): Post-doctoral fellow, Kyoto University (supervisor: Iwao Tabushi)
1984 (September) – 1989 (August): Assistant Professor, Department of Chemistry and Biochemistry, The University of Texas
1989 (September) – 1992 (August): Associate Professor, Department of Chemistry and Biochemistry, The University of Texas
1992 (September) – 2001 (August): Professor, Department of Chemistry and Biochemistry, The University of Texas
2001 (September) – 2008 (August): Roland K. Pettit Professor, Department of Chemistry and Biochemistry, The University of Texas
2008 (September) – present: Roland K. Pettit Centennial Chair, Department of Chemistry and Biochemistry, The University of Texas
2009 (September) – present: WCU Professor, Yonsei University

Awards and Honors

Dreyfus Teacher Scholar (1988), Sloan Fellow (1989), Arthur C. Cope Scholar (1991), JSPS Senior Visiting Senior Professorship (1992 and 2004), Von Humboldt Stifung (1992), Fellow, AAAS (1999), Izatt-Christensen Award in Macrocyclic Chemistry (2001), Fulbright Specialist (2009), Fellow, Royal Chemical Society (2010), Centenary Award (2011).

Total Publications

(SCI: 516), Patents (81); Citations (SCI): 19.986 (2011, July), h-index: 72

Research Interests

Our research involves the design and construction of molecules carefully tailored so as to accomplish a specific objective. Often these objectives are medically or biologically inspired in that we seek to understand complex biochemical processes through the study of simple, well-characterized "model" compounds or use our knowledge of chemistry to prepare new compounds that could find application in the clinic as novel therapeutic or diagnostic agents.

Pyrrole-based Anion Recognition

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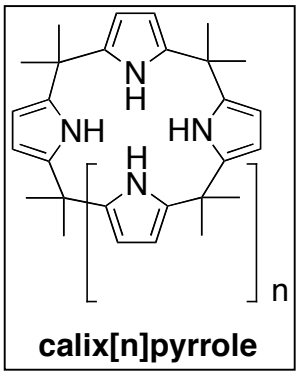
Pyrroles are found in several natural anion binding motifs. However, their use as artificial recognition motifs antedates an appreciation of their role in biological anion binding. As will be detailed in the context of this lecture, an appreciation that pyrrole-containing systems could bind anions dates back to 1990 and early work with expanded porphyrins. Expanded porphyrins are larger versions of naturally occurring blood pigments. Many have proved useful in anion recognition. However, to date, they have only proved useful in this regard when studied in their protonated forms. An ongoing challenge has thus been to create neutral pyrrole-based anion recognition systems. 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. While this latter synthetic chemistry will be reviewed briefly, in this lecture calix[n]pyrroles will be discussed in the context of recent efforts to develop "tunable" systems that are capable of binding selected substrates and acting as "molecular switches" and so-called "smart materials". Potential applications in energy storage, explosives detection, ion extraction, materials chemistry, and other areas of current technological interest will be highlighted.



calix[n]pyrrole

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Lead references

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3. Custelcean, R.; Moyer, B. A.; Sessler, J. L.; Cho, W.-S.; Gross, D.; Bates, G. W.; Brooks, S. J.; Light, M. E.; Gale, P. A. *Angew. Chem. Int. Ed.* **2005**, *44*, 2537-2542; *Angew. Chem.* **2005**, *117*, 2513-2518 (cover).
4. Park, J. S.; Karnas, E.; Ohkubo, K.; Chen, P.; Kadish, K. M.; Fukuzumi, S.; Bielawski, C. W.; Hudnall, R. W.; Lynch, V. M.; Sessler, J. L. *Science* **2010**, *329,* 1324-1326.
5. Rambo, B. M.; Sessler, J. L. *Chem. Eur. J.* **2011**, *17*, 4946 – 4959.