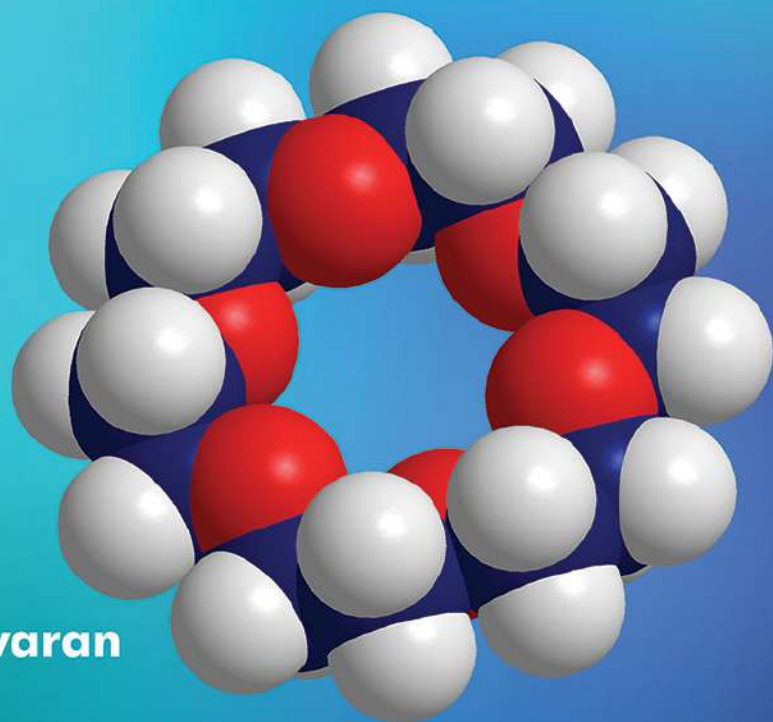
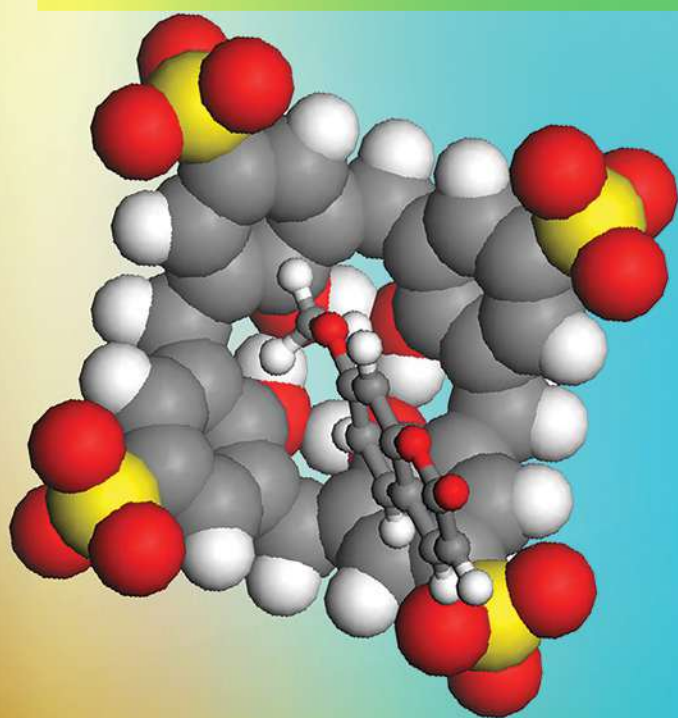




PHOTOPHYSICS OF SUPRAMOLECULAR ARCHITECTURES



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Bentham Books



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Prof. Seenivasan Rajagopal served as senior professor in the Department of Physical Chemistry, School of Chemistry, Madurai Kamaraj University, Madurai, India. He had 43 years of teaching experience and 39 years of research experience. He served as Chairperson of School of Chemistry and Head of the Department of Physical Chemistry at Madurai Kamaraj University, Madurai, Tamilnadu, India. Forty students have earned Ph. D. under his guidance and he published more than 120 papers in reputed journals. He spent one year as UNESCO Fellow at Tokyo Institute of Technology, Japan. He was a Visiting Professor for one year at Institute of Chemistry, Academia Sinica, Taiwan and as Visiting Scientist via Indo-Taiwan Exchange program in the period 2010-2012. He operated more than ten projects. His research work has been widely cited particularly in fundamental text books like Advanced Organic Chemistry by J. March, 4th Edition, Wiley, 1992, New York and Advanced Physical Chemistry by P. W. Atkins and Juilo de Paula, Oxford University Press, 2006, London.

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CHAPTER 4

Pillararenes: Younger Luminescent Supramolecular Systems

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Abstract: Since the development of supramolecular chemistry, synthetic macrocycles have also played an inevitable role in constructing the host-guest system. Among pillar[n]arenes, in short pillarenes, a decade-old younger member in the supramolecular family, after reported by Ogoshi *et al.* in 2008, has gained considerable attention. Due to the straightforward preparation methods, tunable cavity size, and symmetrical architecture makes it an ideal candidate in the supramolecular family. With this perspective, this chapter discusses a brief introduction to the synthesis, characterization, and structural features of different sizes of pillarenes. The presence of a confined hydrophobic and π -electron-rich cavity provided by a paraxyl ether or hydroquinone units offers a unique host-guest recognition capability towards positively charged and neutral molecules. Notably, the presence of a cavity with an aromatic wall provides a broad luminescent platform for various photophysical studies. This chapter elaborates on the contribution of pillarenes in tuning the photophysical properties of the small guest molecules and the formation of luminescent supramolecular materials. Further, the functionalization on the outer of the pillarenes has influenced the photophysical responses such as absorption and fluorescence, which paved a pathway for the development of supramolecular organic light-emitting functional material and novel sensor materials also discussed in this chapter. Finally, this chapter discusses all the progress and applications of luminescence pillarenes and their derivatives.

Keywords: Host, Host-Guest Chemistry, Luminescent materials, Pillararenes, Stimuli-Responsive.

INTRODUCTION

The flourishing tailored interest from the biomolecules created a lot of attention with attraction in the development of various supramolecular systems, which are projected as bio-mimics [1]. The ever-growing attraction in supramolecular chemistry can be recognized from its versatile application in diverse platforms

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