

## **CURRICULAM VITAE**



**Name** : **Professor S. P. Rath**  
**Date of Birth** : February 3, 1972  
**Present Address** : Department of Chemistry  
 Indian Institute of Technology Kanpur  
 Kanpur-208016  
 Tel. : +91-512-259 7251 (O); 259 6069 (L)  
 Fax.: +91-512-259 7436/259 0260

Email: sprath@iitk.ac.in, sankarrath04@gmail.com

URL : <http://home.iitk.ac.in/~sprath>

**Present Position** : *Jagdeo N. Gupta and Smt Murti Gupta Chair Professor*

### **Education:**

- Ph. D.: Department of Inorganic Chemistry, Indian Association for the Cultivation of Science, Jadavpur (1999) (Supervisor: Prof. Animesh Chakravorty)
- M.Sc.: Calcutta University (1994)
- B.Sc. (*Hons.* in Chemistry): Calcutta University (1992) (College: Ramakrishna Mission Vidyamandira, Belur Math)

### **Work Experience:**

- *Professor*, Department of Chemistry, Indian Institute of Technology Kanpur, June 2014-
- *AvH Fellow* (Experienced Researcher) (academic host Prof. Dr. Peter Comba) Anorganisch-Chemisches Institut, Heidelberg University, Germany Dec. 2012-to-July, 2013
- *Associate Professor*, Department of Chemistry Indian Institute of Technology Kanpur, May 2009-May 2014
- *Assistant Professor*, Department of Chemistry Indian Institute of Technology Kanpur, Dec. 2004-April 2009
- *NIH Post-doctoral Research Associate* (with Prof. Alan L. Balch) Department of Chemistry, University of California, Davis, USA. 2001-2004
- *Research Associate* (with Prof. A. Chakravorty) Department of Inorganic Chemistry, IACS, Kolkata 1999-2000

**Awards and/or other recognitions received:**

- (a) *Jagdeo N. Gupta and Smt Murti Gupta Chair Professor*, IIT Kanpur (2017-2020)
- (b) *Bronze Medal* from Chemical Research Society of India (CRSI)- 2015
- (c) *Alexander von Humboldt Research Fellowship for Experienced Researcher* in 2012
- (d) *P. K. Kelkar Faculty Research Fellowship* from IIT Kanpur (2009-2012)
- (e) Received Commendations several times from the **Director**, IIT Kanpur for excellence in teaching as “**Outstanding Instructor**”

**Membership in Professional Society:**

- Life member, Chemical Research Society of India (CRSI)
- Member, Society of Biological Inorganic Chemistry (SBIC)
- Member, American Chemical Society (ACS)
- Member, Society of Porphyrins and Phthalocyanines (SPP)
- Life member, Indian Association for the Cultivation of Science (IACS)

**National/International Committee Work:**

- Member, Academic Advisory Committee, IIT Jodhpur (2008-10)
- Member, Interview Committee, KVPY, IISc Bangalore for several years
- Member, Selection Committee of several universities, NIT etc
- External Expert, The National Science Centre, Poland, 2015-
- Member, Young Scientist Expert Committee-Chemical Sciences, Science & Engineering Research Board (SERB), 2015-
- Regular reviewer of major scientific journals published by ACS, RSC, VCH, Elsevier etc
- Chaired several sessions in National and International Conferences in India and Abroad
- Convener, *ACS-on-Campus* program of American Chemical Society (ACS)
- Reviewed various projects of the funding agencies such as DST/SERB (India), CSIR (India), NSC (Poland), NIH (US) and NSF (US).
- Reviewed many Master and PhD thesis from indian universities, NIT and IITs

**Research Areas of Interest:**

- Bio-inorganic Chemistry
- Multiheme Proteins and Enzymes
- Binding and Activation of Small Molecules
- Supramolecular Chirogenesis
- NMR Spectroscopy of Paramagnetic Molecules

### Thesis Supervision at IIT Kanpur:

- PhD awarded: 10
- PhD enrolled: 14
- Post-doctoral Research Associate: 04
- M.Sc. thesis supervision: 25
- Summer project students: ~30 including academy and INSPIRE students

### Sponsored Projects:

Period	Sponsoring Organization	Title of Project
2017-2020	SERB, DST	Modeling Diheme Enzyme <i>MauG</i> : Understanding Nature's Design, Structure-Function Correlation and Application
2017-2020	CSIR	Probing Molecular Chirality by dimeric metalloporphyrin hosts: Transfer, Control and Rationalization using <i>Exciton Coupled Circular Dichroism</i>
2014-2017	SERB, DST	Porphyrin Dimers as Model of Di-heme Proteins: Inorganic and Bioinorganic Perspectives and Consequences of Heme-Heme Interactions
2013-2016	CSIR	Supramolecular Chirogenesis in the Bisporphyrin-Based systems upon Interactions with Bidentate Ligands: Origin, Control, and Application
2009-2012	DST	Models for the Photosynthetic Reaction Center: Synthesis, Structure, Reactivity and Photophysical Properties of Porphyrin Dimers and Rationalization of Supramolecular Chirality
2009-2013	CSIR	Nonplanar Metallo-porphyrins and Implications for the Hemoproteins
2009	CARE	Establishment of a CD-Spectrometer Facility
2008-11	REACH	Fabrication of solar cells with biomimetic design of chlorophyll pairs present in green leaves
2006-07	IIT-K	Biomimetic Study of Heme-oxygenase Enzymatic Process
2006-09	DST	Synthesis, Solid and Solution Phase Structure and Reactivity of New Model Intermediates in the Heme-Degradation Process Catalyzed by Heme-Oxygenase
2006-09	CSIR	Synthesis, Structure and Reactivity of Vanadium-Oxophlorins and Related Species: Implications for Heme Protein Intermediates

## Courses Taught:

Has taught a variety of under-graduate (UG) and post-graduate (PG) core/elective courses at the Department of Chemistry, IIT Kanpur.

- CHM 101N            Introductory Chemistry Lab (UG)
- CHM 201N            General Chemistry (UG)
- CHM201R            General Chemistry (UG)
- CHM341              Basic Inorganic Chemistry (UG)
- CHM442/CHM342A Inorganic Chemistry-2 (UG)
- CHM443/CHM343A Inorganic Chemistry Lab (UG)
- CHM 646              Bio-inorganic Chemistry (UG & PG)
- CHM 651              Crystal and Molecular Structure Determination (UG & PG)
- CHM631              Applications of Modern Instrumental Methods (PG)
- CHM 649              Principles of Inorganic Chemistry (PG)
- CHM 691              Frontiers in Inorganic Chemistry (PG)

Also have taught UG course of IIT Rajasthan (now *IIT Jodhpur*) during 2008-09

CHM 101:    General Chemistry (UG)

Received Commendations many times from the **Director**, IIT Kanpur for excellence in teaching as “*Outstanding Instructor*”.

## Invited Lectures Delivered (Selected Only):

- Department of Chemistry, IIT-Kharagpur on June 27, 2017.
- JNCASR, Bangalore on June 14, 2017.
- Department of Inorganic and Physical Chemistry, IISc Bangalore on June 13, 2017.
- Department of Chemistry, IIT-Roorkee on May 29, 2017.
- Department of Chemistry, IISER-Pune on April 28, 2017.
- Department of Chemistry, Delhi University, on March 30, 2017
- National conference on “Recent Advances in Chemical Sciences” during March 25-26, 2017 organized by Department of Chemistry, AMU, Aligarh.
- RSC symposium on 'Inorganic Chemical Biology’” during March 17-18, 2017 organized by Madurai Kamaraj University, Madurai.
- *Institute Foundation Day Lecture*, NIT Patna on January 27, 2017
- *Keynote Lecture* at 5<sup>th</sup> Symposium of Advanced Biological Inorganic Chemistry (SaBIC-2017) held during January 7-11, 2017 in Kolkata.
- Institute for Intensive Research in Basic Sciences, M.G. University, Kerala on January 07, 2017

- Recent Trends in Inorganic and Supramolecular Chemistry held at Department of Chemistry at IIT Kanpur on October 26, 2016
- Department of Chemistry, Indian Institute of Technology Bombay on April 11, 2016
- National Symposium on Facets of Chemistry in Biology (FOCB-2016) held at St. Xavier's College (Autonomous), Kolkata on February 22-23, 2016
- Department of Chemistry, Calcutta University, Kolkata on February 22, 2016
- 22<sup>nd</sup> Annual Meeting of National Magnetic Resonance Society, India (NMRS-2016) on 18-21<sup>st</sup> February, 2016 at Indian Institute of Technology, Kharagpur
- Bronze medal lecture at the 18<sup>th</sup> CRSI National Symposium in Chemistry in Chandigarh, India, during Feb. 4-7, 2016.
- Department of Chemistry, IISER-Pune on January 25, 2016.
- Frontiers in Chemistry-2016 held at National Institute of Science Education and Research (NISER), Bhubaneswar on January 09, 2016
- Lucknow Science Congress (LUSCON-2015) in the B. B. Ambedkar University at Lucknow during October 30 to November 1, 2015.
- 17th International Conference on Biological Inorganic Chemistry (ICBIC-17) held during July 20-24, 2015 in Beijing, China (and also have Chaired a session).
- Institute Colloquium at Institute of Inorganic and Analytical Chemistry, Goethe-Universität Frankfurt, Germany on July 15, 2015.
- Institute Colloquium at Institute of Organic Chemistry, University of Siegen, Germany, on July 13, 2015
- Institute Colloquium at Institute of Inorganic and Analytical Chemistry, Justus-Liebig-Universität, Gießen, Germany, on July 2, 2015.
- Institute Colloquium at Institute of Inorganic and Analytical Chemistry, Johannes Gutenberg-Universität, Mainz, Germany on June 16, 2015.
- Institute of Inorganic and Analytical Chemistry, Heidelberg University, Heidelberg, Germany on June 9, 2015.
- Institute Colloquium at Institute of Inorganic and Analytical Chemistry, Universität Stuttgart, Stuttgart, Germany on June 2, 2015.

- National Seminar-2015 held on the Department of Chemistry, the University of Burdwan, Burdwan, West Bengal during 19-21 February 2015 (and also have **Chaired** a session).
- 13<sup>th</sup> Eurasia Conference on Chemical Sciences (EuAsC2S-13) at the Indian Institute of Science (IISc), Bangalore, India, during Dec. 14-18, 2014.
- 7<sup>th</sup> Asian Biological Inorganic Chemistry Conference (AsBIC-7) held on Queensland, Australia during November 30- December 5, 2014 (and also have **Chaired** a session).
- 41<sup>st</sup> International Conference on Coordination Chemistry (ICCC41) held on Singapore during 21-25 July 2014 (and also have **Chaired** a session).
- INSPIRE (Innovation in Science Pursuit for Inspired Research) Science Camp held on Meerat during July 24-27, 2014.
- 8<sup>th</sup> International Conference on Porphyrins and Phthalocyanines (ICPP-8) held on Istanbul, Turkey during June 22-27, 2014 (and also have **Chaired** a session).
- Indo-French seminar on 'Bio-inorganic Approaches to Current Health Problems' held on Pondicherry University, Pudhucherry during March 24 - 28, 2014.
- School of Chemistry, University of Hyderabad on March 7, 2014.
- India-France Collaborative Symposium titled “Functional metal-organics: Applications in materials and catalysis” held on NISER-Bhubaneshwar during February 24-26, 2014.
- Department of Chemistry, IISER-Kolkata on February 21, 2014.
- Symposium on Modern Trends in Inorganic Chemistry-XV (MTIC) held on IIT Roorkee on December 13-16, 2013
- 12<sup>th</sup> International Symposium on Applied Bioinorganic Chemistry (ISABC12) held on Guangzhou, China on December 3-6, 2013 (and also have **Chaired** a session).
- Department of Chemistry, NIT-Rourkela on November 15, 2013.
- 4<sup>th</sup> Asian Conference on Coordination Chemistry (ACCC-4) held on International Convention Center, Jeju, Korea on November 4-7, 2013 (and also have **Chaired** a session).
- International Conference on Interdisciplinary Areas with Chemical Sciences (ICIACS-2013) held on Punjab University, Chandigarh on October 30 - 1<sup>st</sup> November, 2013 organized by Punjab University in association with Institute of Nano Science and Technology, Mohali.
- 4<sup>th</sup> International Collaborative and Cooperative Symposium (ICCCS-4) held on IITK on October 24-26, 2013.

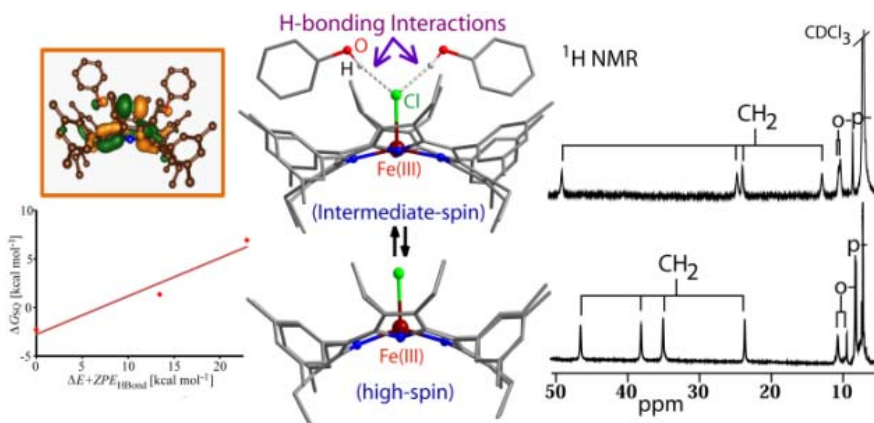
- Institute Colloquium at Department of Chemistry and Earth Sciences, Heidelberg University, Germany on July 1, 2013.
- Institute Colloquium at Institute of Chemistry and Biochemistry, Freie Universität, Berlin, Germany on June 03, 2013.
- Institute Colloquium at Institut für Anorganische und Analytische Chemie, Technische Universität, Braunschweig, Germany on May 29, 2013.
- Institute Colloquium at Department of Chemistry and Pharmacy, Friedrich-Alexander-University Erlangen-Nuremberg, Germany on May 13, 2013.
- Institute Colloquium at Institut für Anorganische Chemie, Georg-August-Universität Göttingen Tammannstrasse 4, Göttingen, Germany on April 23, 2013
- Institute Colloquium at Institut für Anorganische Chemie, Technische Universität Kaiserslautern, Germany on March 07, 2013.
- Institute Colloquium at Institut für Anorganische Chemie, Karlsruher Institut für Technologie, Germany on February 04, 2013.
- Department of Chemistry and Earth Sciences, Heidelberg University, Germany on January 08, 2013.
- Bioinorganic Chemistry Zing Conference held on Lanzarote, Spain during February 19-22, 2013.
- Lecture Workshop on Bioinorganic Chemistry and its Application sponsored by National Science Academies held on School of Chemistry, Madurai Kamaraj University, Madurai-625021 during September 28-30, 2012.
- *ChemFest*, Department of Chemistry, IIT Kanpur on September 1, 2012.
- Department of Inorganic Chemistry, IACS-Kolkata on March 12, 2012.
- National Symposium on Advanced Functional Materials under UGC-CAS Program held on the Department of Chemistry, Banaras Hindu University, during February 11-12, 2012.
- Celebration Chemistry @IITK held on the Department of Chemistry, IIT Kanpur, during December 3-5, 2011.
- Workshop on Advances in Bioinorganic and Nano-Chemistry held on D.A-V. Post graduate College, Civil Lines, Kanpur, during November 12-13, 2011.
- Department of Chemistry, IIT Roorkee on June 10, 2011.
- Department of Chemistry, IIT Kharagpur on June 6, 2011.
- Department of Chemistry and Chemical Technology, Vidyasagar University on June 7, 2011.

- 13<sup>th</sup> CRSI and 5<sup>th</sup> RSC Symposium held on NISER-Bhubaneswar, during February 03-06, 2011.
- FICS-2010 Symposium held on IIT Guwahati, during December 03-04, 2010.
- International Conference on 60th Anniversary Conference on Coordination Chemistry in Osaka, JAPAN during September 27-30, 2010 organized by Chemical Society of Japan.
- International Conference on Porphyrin and Phthalocyanines held on New Maxico, USA during July 3-10, 2010.
- Department of Chemistry, University of California, Davis, USA on 12<sup>th</sup> July, 2010.
- DST Group Monitoring Workshop at Department of Chemistry, IITK on April 05, 2010.
- National Symposium on Modern Trends in Inorganic Chemistry (MTIC-XIII) held on IISc, Bangalore during Dec. 7-10, 2009.
- School and Symposium on Advanced Biological Inorganic Chemistry (SaBIC-2009) held at TIFR, Mumbai during Nov. 2-7, 2009.
- 2<sup>nd</sup> Asian Conference on Coordination Chemistry (ACCC-2), held on Nanjing, CHINA during Nov. 1-4, 2009.
- DST Group Monitoring Workshop at Department of Chemistry, Kalyani University on April 10, 2009.
- Department of Chemistry, IIT Bombay on June 19, 2009.
- Department of Chemical Sciences, TIFR, Mumbai on June 15, 2009.
- *ChemFest*, Department of Chemistry, IIT Kanpur on 5<sup>th</sup> April-2008.
- Department of Chemistry and Chemical Technology, Vidyasagar University, West Bengal on 7<sup>th</sup> March, 2007.
- National Symposium on Modern Trends in Inorganic Chemistry (MTIC-XI) held on IIT Delhi from Dec. 8-10, 2005.



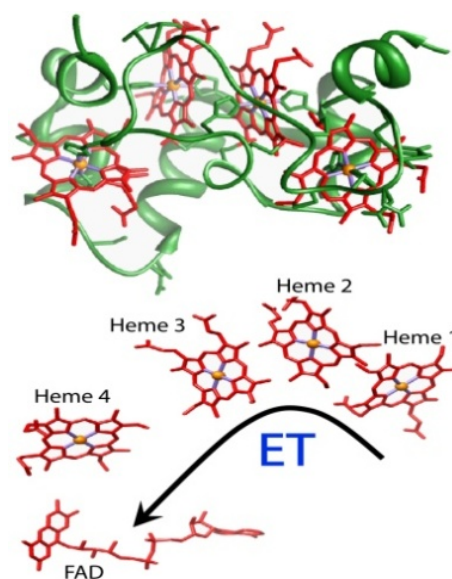
## Brief Summary of the Scientific Contributions:

Prof. Rath's group at IIT Kanpur has been engaged in studying a wide range of research problems from bio-inspired inorganic chemistry viewpoint. The primary objective of all such problems has been to gain a better understanding of the heme centers in heme-proteins that are vital to life. Hemoproteins serve many diverse biological functions through the nearly identical heme prosthetic group, which also displays a wide range of nonplanar conformations. A common feature in many of these systems is the appearance of hydrogen-bonds in the secondary coordination sphere, which are assumed to control the metal-mediated processes. A key step in cytochrome P450 catalysis includes the spin-state change upon substrate binding and the subsequent reduction of the heme. From this perspective in recent years a systematic study has been carried out by Rath and coworkers using synthetic porphyrins. In fact, the spin state has been demonstrated conclusively to switch reversibly in iron(III) porphyrins between high ( $S = 5/2$ ) and intermediate-spin ( $S = 3/2$ ) just by the use of H-bonding which clearly highlights the possible effects and importance of H-bonding interactions in heme proteins.<sup>[1]</sup> Moreover, the studies of porphyrin ring deformation in heme have been shown to be instrumental in modulating various properties such as metal ion displacement, regulating metal spin and redox, and axial ligand affinity and their orientations, which are all related to the various biological functions.<sup>[2-13]</sup>

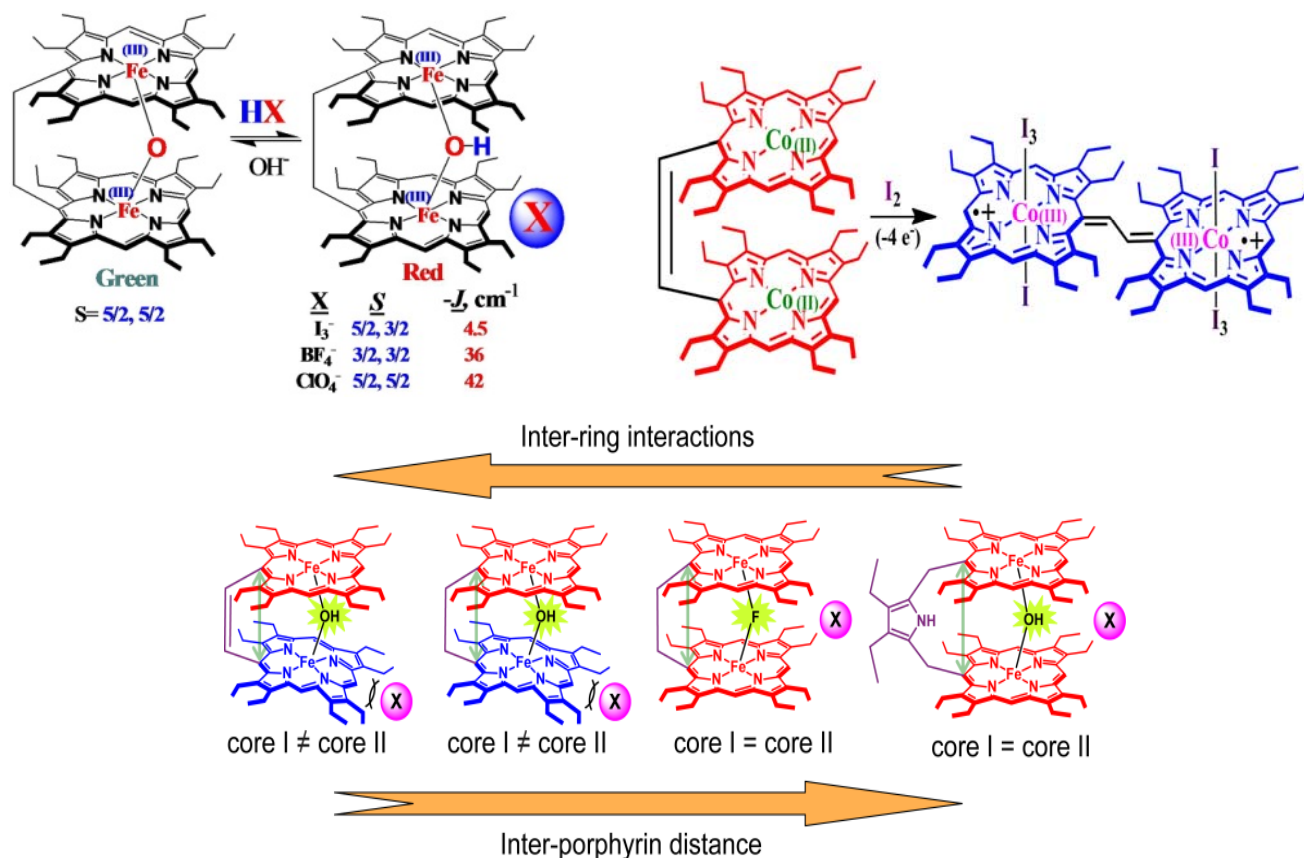


[1] *Angew. Chem. Int. Ed.* **2015**, *54*, 4796; [2] *Chem. Commun.* **2015**, *51*, 16790; [3] *Eur. J. Inorg. Chem.* **2016**, 3305; [4] *Eur. J. Inorg. Chem.* **2016**, 3441; [5] *Inorg. Chem.* **2012**, *51*, 11294; [6] *Inorg. Chem.* **2012**, *51*, 9666; [7] *Dalton Trans.* **2010**, *39*, 5795; [8] *Inorg. Chem.* **2010**, *49*, 2057; [9] *Eur. J. Inorg. Chem.* **2010**, 5211; [10] *Inorg. Chem. Commun.* **2009**, 515; [11] *Eur. J. Inorg. Chem.* **2009**, *5*, 654; [12] *Inorg. Chem.* **2008**, *47*, 8324; [13] *Inorg. Chem.* **2008**, *47*, 9848.

**Investigation on multi-heme proteins and enzymes has emerged as a very important research area today.** Recent discoveries of newer multi-hemes in large numbers and their involvement in various biological processes have raised two pertinent questions: what are the selective advantages of containing so many redox co-factors in a single polypeptide, and why did the spatial distribution of the co-factors evolve to be the way it is? Rath's contribution has made significant impact in understanding the structure-function relationships in this growing interdisciplinary field of science. The approach has been unique: connect step-wise one by one heme centers covalently to mimic the multi-heme centers in proteins and then investigate how the structure-function of the individual heme center differs. This strategy would require admirable skills to make synthetically challenging target molecules through large number of synthetic steps. The large difference in structure, chemical and electrochemical properties of the di-hemes, as compared to the mono heme, have provided an unequivocal evidence of the role played by heme-heme interaction in di-hemes.<sup>[1-6]</sup> To exploit such

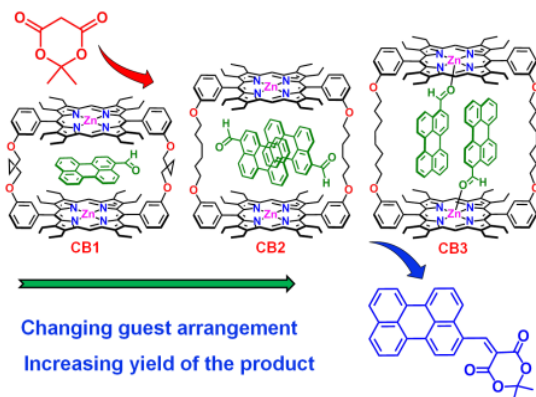


interaction further, a series of remarkably bent bisFe(III)- $\mu$ -oxo porphyrins have been prepared which show unusual reactivity.<sup>[7-10]</sup> Protonation of such  $\mu$ -oxo dimer results in the formation of  $\mu$ -hydroxo complex in which two heme centers comes even closer resulting much stronger inter-ring interactions. This has led to the stabilization of a hitherto unknown family of  $\mu$ -hydroxo complex in which two different spin states of Fe(III) are stabilized in a single molecular framework.<sup>[10-19]</sup> Spin states are also found to be controlled by counter ions although they are far away from the metal centers. The possible role of tryptophan between two heme centers in diheme cytochrome c peroxidase, MauG, and other diheme peroxidases have also been explored successfully.<sup>[20-25]</sup>



[1] *Dalton Trans.* **2015**, 44, 16195; [2] *Inorg. Chem.* **2014**, 53, 11925; [3] *Dalton Trans.* **2014**, 43, 2301; [4] *Chem. Eur. J.* **2013**, 19, 13732; [5] *Chem. Commun.* **2011**, 47, 4790; [6] *Eur. J. Inorg. Chem.* **2010**, 5211; [7] *Inorg. Chem.* **2010**, 49, 3449; [8] *Inorg. Chim. Acta.* **2010**, 363, 2791; [9] *Inorg. Chem.* **2008**, 47, 10196; [10] *Coord. Chem. Rev.* **2017**, 337, 112; [11] *Dalton Trans.* **2017**, 46, 1012; [12] *Chem. Eur. J.* **2016**, 22, 16124; [13] *Chem. Eur. J.* **2016**, 22, 14585; [14] *Chem. Eur. J.* **2016**, 22, 11214; [15] *Inorg. Chem.* **2016**, 55, 3229; [16] *Inorg. Chem.* **2015**, 54, 1919; [17] *Chem. Eur. J.* **2013**, 19, 17846; [18] *Chem. Eur. J.* **2012**, 18, 13025; [19] *J. Am. Chem. Soc.* **2010**, 132, 17983; [20] *Angew. Chem. Int. Ed.* **2016**, 55, 996; [21] *Angew. Chem. Int. Ed.* **2017**, 56, 8849; [22] *Chem. Sci.* **2016**, 7, 1212; [23] *Inorg. Chem.* **2016**, 55, 3229; [24] *Chem. Eur. J.* **2017**, 23, 0000; [25] *Chem. Eur. J.* **2017**, 23, 0000.

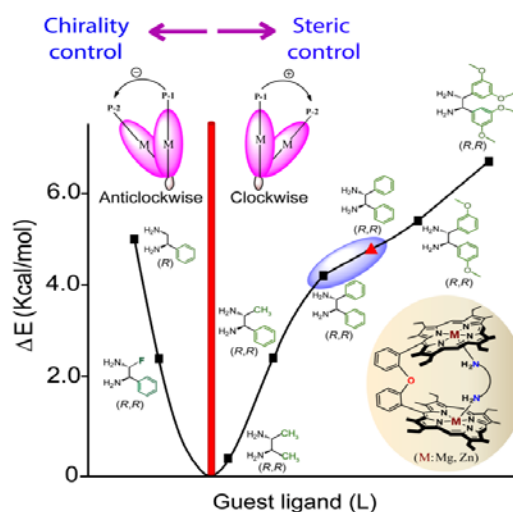
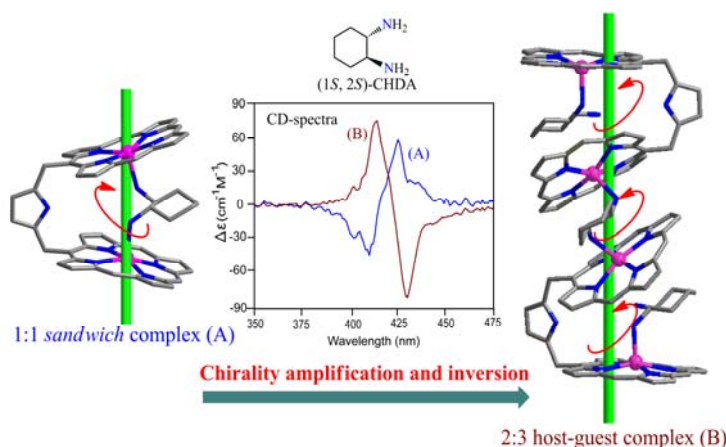
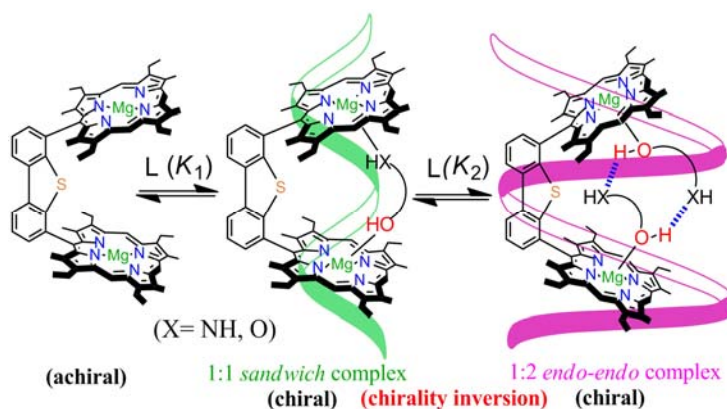
**Developing synthetic receptors with molecular pockets or cavities capable of binding substrates that mimic various chemical processes in Nature have long been significant goals.** In this regard, the molecular receptors such as covalently-linked porphyrin dimers have been explored as molecular clefts for the binding and activation of a variety of substrates. Encapsulation of substrates to such molecular container has been demonstrated to change its photophysical and chemical property drastically, alter the course of reactions, contort conformations and enable facile electron transfer.<sup>[1-8]</sup> The cooperative interaction derived from two porphyrins plays crucial role in exerting these functions.



- [1] *Chem. Eur. J.* **2017**, *23*, 7093; [2] *Chem. Asian. J.* **2017**, *12*, 1824; [3] *Chem. Eur. J.* **2016**, *22*, 5607; [4] *Eur. J. Inorg. Chem.* **2015**, 4956; [5] *Chem. Eur. J.* **2012**, *18*, 7404; [6] *Chem. Eur. J.* **2011**, *17*, 11478; [7] *Dalton Trans.* **2013**, 42, 12381; [8] *Isr. J. Chem.* **2016**, *56*, 144.

**Supramolecular chirogenesis is one of the most important interdisciplinary fields to be looked into, because of its occurrences in many natural and artificial systems.** Rath's group has contributed significantly towards understanding the origin and various aspects of chirality control and induction at the molecular level using Exciton Coupled Circular Dichroism (ECCD) that is based on detecting the through-space exciton interaction between helically orientated independently conjugated chromophores.

Spectroscopic investigation along with DFT study have rationalized the origin of the optical activity unambiguously in the supramolecular host-guest complexes consisting of metalloporphyrin dimer and chiral ligands.<sup>[1-9]</sup> Such studies will have immediate application in asymmetric catalysis, development of an efficient chirality sensor for various classes of chiral compounds, and would opened up further perspectives for the design of smart chiroptical devices.



- [1] *Inorg. Chem.* **2017**, *56*, 3849; [2] *Inorg. Chem.* **2016**, *55*, 13014; [3] *J. Org. Chem.* **2016**, *81*, 5440; [4] *Chem. Commun.* **2015**, *51*, 14107; [5] *Chem. Commun.* **2015**, *51*, 895; [6] *Chem. Commun.* **2014**, *50*, 14037; [7] *Inorg. Chem.* **2014**, *53*, 2381; [8] *Inorg. Chem.* **2014**, *53*, 49; [9] *Chem. Commun.* **2012**, *48*, 4070.

## List of Ten Most Significant Publications from IIT-K:

- 1. A Remarkably Bent Diiron(III)- $\mu$ -Hydroxo Bisporphyrin: Unusual Stabilization of Two Spin States of Iron in a Single Molecular Framework**  
S. K. Ghosh and S. P. Rath\*  
*J. Am. Chem. Soc.* **2010**, *132*, 17983 - 17985.
- 2. Silver(III)•••Silver(III) Interaction Stabilizes the *Syn*-form in a Porphyrin Dimer Upon Oxidation**  
A. K. Singh, F. S. T. Khan and S. P. Rath\*  
*Angew. Chem. Int. Ed.* **2017**, *56*, 8849-8854.
- 3. Highly Oxidized Cobalt Porphyrin Dimer: Spin Coupling and Stabilization of 4e-Oxidized Product**  
S. Dey, D. Sil and S. P. Rath\*  
*Angew. Chem. Int. Ed.* **2016**, *55*, 996-1000.
- 4. Hydrogen-Bonding Interactions Trigger a Spin-Flip in Iron(III)-Porphyrin Complexes**  
D. Sahoo, M. G. Quesne, S. P. de Visser\* and S. P. Rath\*  
*Angew. Chem. Int. Ed.* **2015**, *54*, 4796 - 4800.
- 5. Oxidation Triggers Extensive Conjugation and Unusual Stabilization of Two Di-heme Dication Diradical Intermediates: Role of Bridging Group for Electronic Communication**  
D. Sil, S. Dey and S. P. Rath\*  
*Chem. Sci.*, **2016**, *7*, 1212-1223. (*Edge Article*)
- 6. Controlled Generation of Highly Saddled (porphyrinato) Iron(III) Iodide, Tri-iodide and One-electron Oxidized Complex**  
D. Sahoo, and S. P. Rath\*  
*Chem. Commun.* **2015**, *51*, 16790-16793.

7. **Step-wise Induction, Amplification and Inversion of Molecular Chirality Through the Coordination of Chiral Diamines with Zn(II)bisporphyrin**  
S. A. Iqbal, S. Brahma and S. P. Rath\*  
*Chem. Commun.* **2015**, *51*, 895 - 898.
8. **Metal-coordination-driven Mixed Ligand Binding in Supramolecular Bisporphyrin Tweezers**  
Sk. A. Iqbal, A. Dhamija and S. P. Rath\*  
*Chem. Commun.*, **2015**, *51*, 14107 - 14110.
9. **Transfer and Control of Molecular Chirality in the 1:2 Host-Guest Supramolecular Complex Consisting of Mg(II) bisporphyrin and Chiral Diols: Effect of H-bonding on Rationalization of Chirality**  
Sk. A. Iqbal, S. Brahma and S. P. Rath\*  
*Chem. Commun.* **2014**, *50*, 14037 - 14040.
10. **Induction of Supramolecular Chirality in Di-Zinc(II) Bisporphyrin via Tweezer Formation: Synthesis, Structure and Rationalization of Chirality**  
S. Brahma, Sk. A. Iqbal, S. Dey and S. P. Rath\*  
*Chem. Commun.* **2012**, *48*, 4070 - 4072. (*Invited article in a special thematic issue 'Porphyrins and Phthalocyanines'*)

## List of Publications



### Perspective /Review articles:

- Oxo- and Hydroxo-bridged Diiron(III) Porphyrin Dimers: Inorganic and Bio-inorganic Perspectives and Effects of Intermacrocylic Interactions**

T. Guchhait, S. Sasmal, F. S. T. Khan, and S. P. Rath\*

*Coord. Chem. Rev.* **2017**, *337*, 112-144.
- Hydroxo-Bridged Diiron(III) and Dimanganese(III) Bisporphyrins: Modulation of Metal Spins by Counter Anions**

F. S. T. Khan, T. Guchhait, S. Sasmal and S. P. Rath\*

*Dalton Trans.* **2017**, *46*, 1012-1037 (*Invited Perspective and Cover page Article*)
- Ethane-bridged Porphyrin Dimer as Model of Di-heme Proteins: Inorganic and Bioinorganic Perspectives and Consequences of Heme-Heme Interactions**

D. Sil and S. P. Rath\*

*Dalton Trans.* **2015**, *44*, 16195 - 16211. (*Invited Perspective Article*)

## Complete List of Publications

94. **Silver(III)•••Silver(III) Interaction that Stabilizes the *Syn*-form in a Porphyrin Dimer Upon Oxidation**  
A. K. Singh, F. S. T. Khan and S. P. Rath\*  
*Angew. Chem. Int. Ed.* **2017**, *56*, 8849-8854
93. **Intermacrocyclic Interaction Triggers Facile One-step Synthesis of a Chlorin-Porphyrin Heterodimer**  
Y. A. Pandit and S. P. Rath\*  
*Chem. Eur. J.* **2017**, *23*, ASAP. (DOI: 10.1002/chem.201701943)
92. **Probing Bis-Fe<sup>IV</sup> MauG: Isolation of Highly Reactive Radical Intermediates**  
T. Guchhait, S. Sarkar, Y. A. Pandit and S. P. Rath\*  
*Chem. Eur. J. (Communication)* **2017**, *23*, ASAP. (DOI: 10.1002/chem.201702321)
91. **Cyclic Bisporphyrin Based Flexible Molecular Containers: Controlling Guest Arrangements and Supramolecular Catalysis by Tuning Cavity Size**  
P. Mondal, S. Sarkar and S. P. Rath\*  
*Chem. Eur. J.* **2017**, *23*, 7093-7103.
90. **A Tunable Cyclic Container: Guest-Induced Conformational Switching, Efficient Guest Exchange and Selective Isolation of C<sub>70</sub> from Fullerene Mixture**  
P. Mondal and S. P. Rath\*  
*Chem. Asian J.* **2017**, *12*, 1824-1835.
89. **Oxo- and Hydroxo-bridged Diiron(III) Porphyrin Dimers: Inorganic and Bio-inorganic Perspectives and Effects of Intermacrocylic Interactions**  
T. Guchhait, S. Sasmal, F. S. T. Khan, and S. P. Rath\*  
*Coord. Chem. Rev.* **2017**, *337*, 112-144.
88. **Complexation of Chiral Zinc-Porphyrin *Tweezer* with Achiral Diamines: Induction and Two-Step Inversion of Interporphyrin Helicity Monitored by ECD**  
B. Saha, S. A. Iqbal, A. G. Petrovic, N. Berova\* and S. P. Rath\*  
*Inorg. Chem.* **2017**, *56*, 3849-3860.

87. **Hydroxo-Bridged Diiron(III) and Dimanganese(III) Bisporphyrins: Modulation of Metal Spins by Counter Anions**  
F. S. T. Khan, T. Guchhait, S. Sasmal and S. P. Rath\*  
*Dalton Trans.* **2017**, *46*, 1012-1037 (*Invited Perspective and Cover page Article*)
86. **Highly Oxidized Cobalt Porphyrin Dimer: Spin Coupling and Stabilization of 4e-Oxidized Product**  
S. Dey, D. Sil and S. P. Rath\*  
*Angew. Chem. Int. Ed.* **2016**, *55*, 996-1000.
85. **Hydrogen-Bonding Interactions Trigger a Spin-Flip in Iron(III)-Porphyrin Complexes**  
D. Sahoo, M. G. Quesne, S. P. de Visser\* and S. P. Rath\*  
*Angew. Chem. Int. Ed.* **2015**, *54*, 4796 - 4800.
84. **Oxidation Triggers Extensive Conjugation and Unusual Stabilization of Two Di-heme Dication Diradical Intermediates: Role of Bridging Group for Electronic Communication**  
D. Sil, S. Dey and S. P. Rath\*  
*Chem. Sci.*, **2016**, *7*, 1212-1223. (*Edge Article*)
83. **A Nonempirical Approach for Direct Determination of the Absolute Configuration of 1,2-Diols and Amino Alcohols using Mg(II)bisporphyrin**  
S. A. Iqbal, A. Dhamija, S. Brahma and S. P. Rath\*  
*J. Org. Chem.*, **2016**, *81*, 5440–5449.
82. **Remarkable Anion Dependent Spin state Switching in Diiron(III)- $\mu$ -Hydroxo Bisporphyrins: What role do Counter ions play?**  
F. S. T. Khan and S. P. Rath\*  
*Chem. Eur. J.* **2016**, *22*, 16124-16137.
81. **Diiron(III)- $\mu$ -fluoro Bisporphyrins: Effect of Bridging Ligand on the Metal Spin State**  
D. Sil, A. Kumar and S. P. Rath  
*Chem. Eur. J.* **2016**, *22*, 11214-11223. [*Highlighted as Frontispiece (Hot Paper)*]
80. **Effect of Inter-porphyrin Distance on Spin-state in Diiron(III)  $\mu$ -Hydroxo Bisporphyrins**  
D. Sil and S. P. Rath\*  
*Chem. Eur. J.* **2016**, *22*, 14585-14597.



79. **Cyclic Zn(II)bisporphyrin Based Molecular Switch: Supramolecular Control of Complexation Mediated Conformational Switching and Photoinduced Electron Transfer**  
P. Mondal and S. P. Rath\*  
*Chem. Eur. J.* **2016**, *22*, 5607-5619.
78. **Binuclear Highly distorted Iron(III) Porphyrins Bridged by the Dianions of Hydroquinones: Role of Bridge in the Electronic Communication**  
D. Sahoo, A. K. Singh and S. P. Rath\*  
*Eur. J. Inorg. Chem.* **2016**, 3305-3313.
77. **Spin Modulation in Highly Distorted Fe(III) Porphyrinates Using Axial Coordination and their  $\pi$ -Cation Radicals**  
D. Sahoo, T. Guchhait and S. P. Rath\*  
*Eur. J. Inorg. Chem.* **2016**, 3441-3453.
76. **Induction and Rationalization of Supramolecular Chirality in the Tweezer–Diamine Complexes: Insights from Experimental and DFT Studies**  
A. Dhamija, S. A. Iqbal and S. P. Rath\*  
*Inorg. Chem.*, **2016**, *55*, 13014-13026.
75. **Experimental and Theoretical Investigation on a Series of Novel Dimanganese(III)- $\mu$ -hydroxo Bisporphyrins: Magneto-Structural Correlation and Effect of Metal Spin on Porphyrin Core Deformation**  
D. Sil, S. Bhowmik, F. Khan and S. P. Rath\*  
*Inorg. Chem.* **2016**, *55*, 3239-3251.
74. **Effect of Two Interacting Rings in Metalloporphyrin Dimers upon Stepwise Oxidations**  
S. Dey, D. Sil, Y. A. Pandit and S. P. Rath\*  
*Inorg. Chem.* **2016**, *55*, 3229-3238.
73. **Controlled Generation of Highly Saddled (porphyrinato) Iron(III) Iodide, Tri-iodide and One-electron Oxidized Complex**  
D. Sahoo, and S. P. Rath\*  
*Chem. Commun.* **2015**, *51*, 16790-16793.

72. **Step-wise Induction, Amplification and Inversion of Molecular Chirality Through the Coordination of Chiral Diamines with Zn(II)bisporphyrin**  
S. A. Iqbal, S. Brahma and S. P. Rath\*  
*Chem. Commun.* **2015**, *51*, 895 - 898.
71. **Metal-coordination-driven Mixed Ligand Binding in Supramolecular Bisporphyrin Tweezers**  
Sk. A. Iqbal, A. Dhamija and S. P. Rath\*  
*Chem. Commun.*, **2015**, *51*, 14107 - 14110.
70. **Ethane-bridged Porphyrin Dimer as Model of Di-heme Proteins: Inorganic and Bioinorganic Perspectives and Consequences of Heme-Heme Interactions**  
D. Sil and S. P. Rath\*  
*Dalton Trans.* **2015**, *44*, 16195 - 16211. (*Invited Perspective article*)
69. **Spin State Ordering in Hydroxo Bridged Diiron(III)bisporphyrin Complexes**  
M. A. Sainna, D. Sil, D. Sahoo, B. Martin, S. P. Rath,\* P. Comba\* and S. P. de Visser\*  
*Inorg. Chem.* **2015**, *54*, 1919 - 1930.
68. **Highly Selective and Sensitive Detection of Picric Acid Explosive by a Bisporphyrin Cleft: Synergistic Effects of Encapsulation, Efficient Electron Transfer, and Hydrogen Bonding**  
P. Mondal and S. P. Rath\*  
*Eur. J. Inorg. Chem.* **2015**, 4956-4964.
67. **Aggregation-Controlled Excimer Emission in an Axial Anthracene-Sn(IV)Porphyrin-Anthracene Triad in Solid and Solution Phases**  
S. Dey, P. Mondal and S.P. Rath\*  
*New J. Chem.* **2015**, *39*, 4100 - 4108. (*Invited article*)
66. **Stoichiometry-controlled Supramolecular Chirality Induction in Magnesium (II) Porphyrin Dimer by Amino Alcohols: Mechanistic Insights and Effect of Ligand Bulkiness**  
S. A. Iqbal, B. Saha and S. P. Rath\*  
*J. Indian Chem. Soc.* **2015**, *92*, 2001-2014. (*Special issue dedicated to Prof. Animesh Chakravorty on the occasion of his 80<sup>th</sup> birthday*)

65. **Efficient Host-Guest Complexation of a Bisporphyrin Host with Electron Deficient Guests: Synthesis, Structure and Photoinduced Electron Transfer**  
P. Mondal and S. P. Rath\*  
*Isr. J. Chem.* **2016**, *56*, 144-155. (Invited article in a special issue on "Porphyrins and Porphyrinoids")
64. **Iron(III) and Copper(II) Complexes of Trans-bis(ferrocenyl)porphyrin: Effect of Metal Ions on Long-range Electronic Communication**  
D. Sahoo and S. P. Rath\*  
*J. Chem. Sci.* **2015**, *127*, 327 - 335. (Invited article in a Special Issue on MTIC-XV).
63. **Axial Thiophenolate Coordination on Diiron(III)bisporphyrin: Influence of Heme-Heme Interactions on Structure, Function and Electrochemical Properties of the Individual Heme Center**  
D. Sil, F. S. T. Khan and S. P. Rath\*  
*Inorg. Chem.* **2014**, *53*, 11925 - 11936.
62. **Transfer and Control of Molecular Chirality in the 1:2 Host-Guest Supramolecular Complex Consisting of Mg(II) bisporphyrin and Chiral Diols: Effect of H-bonding on Rationalization of Chirality**  
Sk. A. Ikbal, S. Brahma and S. P. Rath\*  
*Chem. Commun.* **2014**, *50*, 14037 - 14040.
61. **Highly Enhanced Bisignate Circular Dichroism of Ferrocene-Bridged Zn(II) Bisporphyrin Tweezer with Extended Chiral Substrates due to Well-matched Host-Guest System**  
S. Brahma, Sk. A. Ikbal, A. Dhamija and S. P. Rath\*  
*Inorg. Chem.* **2014**, *53*, 2381 - 2395.
60. **Synthesis, Structure, and Properties of a Series of Chiral Tweezer-Diamine Complexes Consisting of an Achiral Zinc(II) Bisporphyrin Host and Chiral Diamine Guest: Induction and Rationalization of Supramolecular Chirality**  
S. Brahma, Sk. A. Ikbal and S. P. Rath\*  
*Inorg. Chem.* **2014**, *53*, 49 - 62.

59. **Syn-Anti Conformational Switching in an Ethane-bridged Co(II)bisporphyrin Induced by External Stimuli: Effects of Inter-macrocyclic Interactions, Axial Ligation and Chemical and Electrochemical Oxidations**  
S. Dey and S. P. Rath\*  
*Dalton Trans.* **2014**, *43*, 2301 - 2314.
58. **Building-up Novel Coordination Polymer with Zn(II) Porphyrin Dimer: Synthesis, Structures, Surface Morphology and Effect of Axial Ligands**  
Sk. A. Iqbal, S. Brahma, A. Dhamija and S. P. Rath\*  
*J. Chem. Sci.* **2014**, *126*, 1451 - 1461. (*Invited article in the special issue on "Chemical Crystallography"*).
57. **Self-assembly of Cobalt(II) and Zinc(II) Tetranitro Octaethylporphyrin via Bidentate Axial Ligands: Synthesis, Structure, Surface Morphology and Effect of Axial Coordination**  
S. Dey, Sk A. Iqbal and S. P. Rath\*  
*New J. Chem.* **2013**, *37*, 1458-1470. (*Invited article*)
56. **Unusual Stabilization of an Intermediate Spin of Iron upon Axial Phenoxide Coordination on a Diiron(III)bisporphyrin: Effect of Heme-Heme Interactions**  
S. Bhowmik, S. Dey, D. Sahoo and S. P. Rath\*  
*Chem. Eur. J.* **2013**, *19*, 13732 - 13744.
55. **Supramolecular BODIPY-Zn(II)-Bisporphyrin Dyad and Trinitrofluorenone Encapsulated Triad as Model of Antenna-Reaction Center: Synthesis, Structure and Photophysical Properties**  
P. Mondal, A. Chaudhary and S. P. Rath\*  
*Dalton Trans.* **2013**, *42*, 12381 - 12394.
54. **Effect of Heme-Heme Interactions and Modulation of Metal Spins by Counter Anions in a Series of Diiron(III)- $\mu$ -hydroxo Bisporphyrins: Unusual Stabilization of Two Different Spins in a Single Molecular Framework**  
S. K. Ghosh, S. Bhowmik, D. Sil and S. P. Rath\*  
*Chem. Eur. J.* **2013**, *19*, 17846 - 17859.

53. **Formation of *Exo-exo*, *Exo-endo* and *Tweezer* Conformation Induced by Axial Ligand in a Zn(II)bisporphyrin: Synthesis, Structure and Properties**  
A. Chaudhary, Sk. A Iqbal and S. P. Rath\*  
*Polyhedron* **2013**, *52*, 761 - 769. (*Invited article in a special issue dedicated to Prof. Alfred Werner on the occasion of 100<sup>th</sup> anniversary of the Nobel Prize in Chemistry*).
52. **Building-up Remarkably Stable Magnesium Porphyrin Nano-Structures in One Pot: Synthesis, Structure, Surface Morphology and Effect of Bridging Ligands**  
Sk A. Iqbal, S. Brahma and S. P. Rath\*  
*Inorg. Chem.* **2012**, *51*, 9666 - 9676.
51. **Switching Orientation of Two Axial Imidazole Ligands between Parallel and Perpendicular in Low-Spin Fe(III) and Fe(II) Nonplanar Porphyrinates**  
R. Patra, D. Sahoo, S. Dey and S. P. Rath\*  
*Inorg. Chem.* **2012**, *51*, 11294 - 11305.
50. **Protonation of an oxo-Bridged Diiron Unit Makes Two Iron Centers Different: A New Class of Diiron(III)- $\mu$ -hydroxo Bisporphyrin and Control of Spins by Counter Anions**  
S. Bhowmik, S. K. Ghosh, S. Layek, H. C. Verma and S. P. Rath\*  
*Chem. Eur. J.* **2012**, *18*, 13025 – 13037.
49. **Encapsulation of TCNQ and Acridinium Ion within Bisporphyrin Cavity: Synthesis, Structure, Photophysical and HOMO-LUMO Gap Mediated Electron Transfer Properties**  
A. Chaudhary and S. P. Rath\*  
*Chem. Eur. J.* **2012**, *18*, 7404 - 7417.
48. **Induction of Supramolecular Chirality in Di-Zinc(II) Bisporphyrin via *Tweezer* Formation: Synthesis, Structure and Rationalization of Chirality**  
S. Brahma, Sk. A. Iqbal, S. Dey and S. P. Rath\*  
*Chem. Commun.* **2012**, *48*, 4070 - 4072. (*Invited article in a special thematic issue 'Porphyrins and Phthalocyanines'*)
47. **Efficient Complexation of Pyrrole-bridged Di-Zinc(II) Bisporphyrin with Fluorescent Probe Pyrene: Synthesis, Structure, and Photoinduced Singlet-Singlet Energy Transfer**  
A. Chaudhary and S. P. Rath\*  
*Chem. Eur. J.* **2011**, *17*, 11478 - 11487.

46. **Axial Phenoxide Coordination on Di-Iron(III)bisporphyrin: Insights from Experimental and DFT Studies**  
S. Bhowmik, D. Sil, R. Patra and S. P. Rath\*  
*J. Chem. Sci.* **2011**, *123*, 827 - 837. (Invited article in the special issue of *International Year of Chemistry*).
45. **Models for the Photosynthetic Reaction Center: Synthesis, Structure, and Electrochemical Properties of a Cofacial Di-palladium Bisporphyrin**  
A. Chaudhary, R. Patra and S. P. Rath\*  
*Indian J. Chem., Sec. A.* **2011**, *50*, 1436 - 1442. (Invited article in the special issue dedicated to Acharya Prafulla Chandra Ray on the occasion of his 150th birth anniversary).
44. **Control of Spins by Ring Deformation in a Diiron(III)bisporphyrin: Reversal of  $\text{ClO}_4^-$  and  $\text{CF}_3\text{SO}_3^-$  Ligand Field Strength on the Magnetochemical Series**  
S. Bhowmik, S. K. Ghosh and S. P. Rath\*  
*Chem. Commun.* **2011**, *47*, 4790 - 4792.
43. **Syn-anti Conformational Switching: Synthesis and X-ray Structures of Tweezer and Anti Form in a Zinc Porphyrin Dimer Induced by Axial Ligands**  
S. Brahma, S. A. Iqbal and S. P. Rath\*  
*Inorg. Chim. Acta.* **2011**, *372*, 62 - 70. (Invited article in the special volume dedicated to Professor S. S. Krishnamurthy on the occasion of his 70<sup>th</sup> birth anniversary).
42. **Synthesis, Structure and Properties of a High-Spin Fe(III) Porphyrin with Nonequivalent Axial Ligands: Implications for the Hemoproteins**  
A. Chaudhary, R. Patra and S. P. Rath\*  
*Indian J. Chem., Sec. A.* **2011**, *50*, 432 - 437. (Invited article in the special issue on *Bioinorganic Chemistry* dedicated to Professor S. Mitra on the occasion of his 70<sup>th</sup> birth anniversary).
41. **Magnesium Inserted Porphyrin Compound, Its Blends and Devices Thereof**  
S. S. K. Iyer, S. P. Rath, A. Singh and Sk A. Iqbal  
Patent Application No. **3272/DEL/2011** dated November 17, 2011

40. **A Remarkably Bent Diiron(III)- $\mu$ -Hydroxo Bisporphyrin: Unusual Stabilization of Two Spin States of Iron in a Single Molecular Framework**  
S. K. Ghosh and S. P. Rath\*  
*J. Am. Chem. Soc.* **2010**, *132*, 17983 - 17985.
39. **Binding of Catechols to Iron(III) Octaethyl Porphyrin: An Experimental and DFT Investigation**  
A. Chaudhury, R. Patra and S. P. Rath\*  
*Eur. J. Inorg. Chem.* **2010**, 5211 - 5221.
38. **Effects of Axial Pyridine Coordination in a Saddle-Distorted Porphyrin macrocycle: Stabilization of Hexa-coordinated High-Spin Fe(III) and Air-stable Low-Spin Iron(II) Porphyrinates**  
R. Patra, S. Bhowmik, S. K. Ghosh and S. P. Rath\*  
*Dalton Trans.* **2010**, *39*, 5795 - 5806.
37. **Synthesis, Structure and Photocatalytic Activity of a Remarkably Bent, Cofacial Ethene-linked Diiron(III)  $\mu$ -oxobisporphyrin**  
S. K. Ghosh, R. Patra and S. P. Rath\*  
*Inorg. Chim. Acta.* **2010**, *363*, 2791 - 2799. (*Invited article in the special volume dedicated to Professor A. Chakravorty on the occasion of his 75<sup>th</sup> birth anniversary*).
36. **Synthesis and Characterization of Anti-bisFe(III) Porphyrins, Syn-bisFe(III)- $\mu$ -oxo Porphyrin and Syn-bisFe(III)- $\mu$ -oxo Porphyrin Cation Radical**  
S. K. Ghosh, R. Patra and S. P. Rath\*  
*Inorg. Chem.* **2010**, *49*, 3449 - 3460.
35. **Axial Ligand Orientations in a Distorted Porphyrin Macrocycle: Synthesis, Structure and Properties of Low-Spin bis (Imidazole) Fe(III) and Fe(II) porphyrinates**  
R. Patra, A. Chaudhary, S. K. Ghosh and S. P. Rath\*  
*Inorg. Chem.* **2010**, *49*, 2057 - 2067.
34. **Cyanide Binding to Iron in a Highly Distorted Porphyrin Macrocycle: Synthesis and Structure of Low-spin Fe(II) dicyano Porphyrin**  
R. Patra and S. P. Rath\*  
*Inorg. Chem. Commun.* **2009**, 515 - 519. (*Invited article*)

33. **The Effect of Steric Crowding on Porphyrin Conformation and Ring Orientations in a Series of Iron(III)  $\mu$ -Oxo Dimers Containing *meso*-Nitrooctaethylporphyrins**  
R. Patra, S. Bhowmik, S. K. Ghosh and S. P. Rath\*  
*Eur. J. Inorg. Chem.* **2009**, *5*, 654 - 665.
32. **Modulation of Metal Displacement in a Saddle Distorted Macrocyclic: Synthesis, Structure, and Properties of High Spin Fe(III) porphyrins and Implications for the Hemoproteins**  
R. Patra, A. Chaudhary, S. K. Ghosh and S. P. Rath\*  
*Inorg. Chem.* **2008**, *47*, 8324 - 8335.
31. **Remarkably Bent, Ethane-Linked, Diiron(III)  $\mu$ -Oxobisporphyrin: Synthesis, Structure, Conformational Switching, and Photocatalytic Oxidation**  
S. K. Ghosh, R. Patra and S. P. Rath\*  
*Inorg. Chem.* **2008**, *47*, 10196 - 10198.
30. **Axial Ligand Coordination in Sterically Strained Vanadyl Porphyrins: Synthesis, Structure, and Properties**  
S. K. Ghosh, R. Patra and S. P. Rath\*  
*Inorg. Chem.* **2008**, *47*, 9848 - 9856.
29. **Electronic Structure of the Glyoxalbis(2-hydroxyanil) (gha) Ligand in  $[\text{Co}^{\text{III}}(\text{gha})(\text{PPh}_3)_2]^+$ : Radical vs. Non-radical States**  
A. S. Roy, N. Muresan, H. M. Tuononen, S. P. Rath and P. Ghosh  
*Dalton Trans.* **2008**, *26*, 3438 - 3446.
28. **First Ruthenium Complex of Glyoxalbis(N-phenyl)osazone ( $\text{L}^{\text{NHPH}}\text{H}_2$ ): Synthesis, X-ray Structure, Spectra, and Density Functional Theory Calculations of  $(\text{L}^{\text{NHPH}}\text{H}_2)\text{Ru}(\text{PPh}_3)_2\text{Cl}_2$**   
A. S. Roy, H. M. Tuononen, S. P. Rath and P. Ghosh  
*Inorg. Chem.* **2007**, *46*, 5942 - 5948.
27. **Dioxygen Reactivity of Meso-hydroxylated Hemes: Intermediates in Heme Degradation Process Catalyzed by Heme-oxygenase**  
S. P. Rath\*  
*J. Chem. Sci.* **2006**, *118*, 463 - 474. (*Invited article*)



26. **Electron Distribution in Octaethyloxophlorin Complexes. Importance of the Fe(III) Oxophlorin Trianion Form in the Bis-pyridine and Bis-imidazole Complexes**  
S. P. Rath, M. M. Olmstead and A. L. Balch  
*Inorg. Chem.* **2006**, *45*, 6083 - 6093.
25. **Metal Complexes of *meso*-Amino-octaethylporphyrin and the Oxidation of Ni(II)(*meso*-amino-octaethylporphyrin)**  
N. Sprutta, S. P. Rath, M. M. Olmstead and A. L. Balch  
*Inorg. Chem.* **2005**, *44*, 1452 -1459.
24. **Pyramidalization of Gd<sub>3</sub>N inside a C<sub>80</sub> Cage. The Synthesis and Structure of Gd<sub>3</sub>N<sub>2</sub>C<sub>80</sub>**  
S. Stevenson, J. P. Stevenson, J. E. Reid, M. M. Olmstead, S. P. Rath and A. L. Balch  
*Chem. Commun.* **2004**, 2814 - 2815.
23. **Oxidative Verdoheme Formation and Stabilization by Axial Isocyanide Ligation**  
S. P. Rath, M. M. Olmstead and A. L. Balch  
*Inorg. Chem.* **2004**, *43*, 7648 - 7655.
22. **Reaction of Meso-hydroxyhemes with Carbon Monoxide and Reducing Agents in Search of the Elusive Species Responsible for the g=2.006 Resonance of Carbon Monoxide Treated Heme Oxygenase. Isolation of Diamagnetic Iron(II) Complexes of Octaethyl *meso*-hydroxyporphyrin**  
S. P. Rath, M. M. Olmstead and A. L. Balch  
*Inorg. Chem.* **2004**, *43*, 6357 - 6365.
21. **Formation of a Highly Oxidized Iron Biliverdin Complex Upon Treatment of a Five-coordinate Verdoheme with Dioxygen**  
K. T. Nguyen, S. P. Rath, L. Latos-Grazynski, M. M. Olmstead and A. L. Balch  
*J. Am. Chem. Soc.* **2004**, *126*, 6210 - 6211.
20. **The Effect of Axial Ligands on Spin States and Electron Distribution in Iron Complexes of Octaethyloxophlorin, Intermediates in Heme Degradation**  
S. P. Rath, M. M. Olmstead and A. L. Balch  
*J. Am. Chem. Soc.* **2004**, *126*, 6379 - 6386.

19. **A Novel Pentacoordinated Dioxovanadium(V) Salicylaldimine: Solvent Specific Crystallisation of Dimorphs with Contrasting Coordination Geometries, Ligand Conformations and Supramolecular Architectures**  
B. Baruah, S. P. Rath and A. Chakravorty  
*Eur. J. Inorg. Chem.* **2004**, 1873 - 1878.
18. **Facile Ring Opening of Iron(III) and Iron (II) Complexes of meso-Amino-octaethylporphyrin by Dioxygen**  
S. P. Rath, H. Kalish, L. Latos-Grazynski, M. M. Olmstead and A. L. Balch  
*J. Am. Chem. Soc.* **2004**, 126, 646 - 654.
17. **Formation and Isolation of an Iron-Tripyrrole Complex from Heme Degradation**  
S. P. Rath, M. M. Olmstead, L. Latos-Grazynski and A. L. Balch  
*J. Am. Chem. Soc.* **2003**, 125, 12678 - 12679.
16. **Reversible Binding of Nitric Oxide and Carbon-Carbon Bond Formation in a Meso-Hydroxylated Heme**  
S. P. Rath, R. Koerner, M. M. Olmstead and A. L. Balch  
*J. Am. Chem. Soc.* **2003**, 125, 11798 - 11799.
15. **Heme Cleavage with Remarkable Ease: Paramagnetic Intermediates Formed by Aerial Oxidation of a Meso-Amino-Substituted Iron Porphyrin**  
H. Kalish, H. M. Lee, M. M. Olmstead, L. Latos-Grazynski, S. P. Rath and A. L. Balch  
*J. Am. Chem. Soc.* **2003**, 125, 4674 - 4675.
14. **Synthesis, Structure and Properties of Mononuclear Oxovanadium(V) Alkoxides Incorporating Chelated Ethane-1,2-diol and Propane-1,3-diol**  
K. K. Rajak, S. Mondal and S. P. Rath\*  
*Polyhedron* **2000**, 19, 931 - 936.
13. **Sugar Binding to VO<sup>3+</sup>. Synthesis and Structure of a New Mannopyranoside Vanadate**  
K. K. Rajak, B. Baruah, S. P. Rath and A. Chakravorty  
*Inorg. Chem.* **2000**, 39, 1598 - 1601.

12. **Ruthenium Dithiophosphates: Synthesis, X-ray Crystal Structure, Spectroscopic and Electrochemical Properties**  
P. U. Jain, P. Munshi, M. G. Walawalkar, S. P. Rath and K. K. Rajak and G. K. Lahiri  
*Polyhedron* **2000**, *19*, 801 - 808.
11. **Synthesis, Structure and Catecholase Reaction of a Vanadate Ester System Incorporating Monoionized Catechol Chelation**  
S. P. Rath, K. K. Rajak and A. Chakravorty  
*Inorg. Chem.* **1999**, *38*, 4376 - 4377.
10. **Carbohydrate Binding to  $VO^{3+}$ . Sugar Vanadate Esters Incorporating L-Amino Acid Schiff Bases as Coligands**  
K. K. Rajak, S. P. Rath, S. Mondal and A. Chakravorty  
*Inorg. Chem.* **1999**, *38*, 3283 - 3289.
9. **Sugar Vanadates: Synthesis and Characterisation of Mannopyranoside and Ribofuranoside Esters Incorporating  $VO^{3+}$**   
K. K. Rajak, S. P. Rath, S. Mondal and A. Chakravorty  
*J. Chem. Soc., Dalton Trans* **1999**, 2537 - 2540.
8. **Sugar Vanadates: Synthesis and Characterisation of a Mannopyranoside Ester Incorporating  $VO^{3+}$**   
K. K. Rajak, S. P. Rath, S. Mondal and A. Chakravorty  
*Indian J. Chem.* **1999**, *38A*, 405 - 406.
7. **A Family of (N-Salicylidene- $\alpha$ -aminoacidato)Vanadate Esters Incorporating Propane-1,3-diol and Glycerol: Synthesis, Structure and Reaction**  
S. Mondal, S. P. Rath, K. K. Rajak and A. Chakravorty  
*Inorg. Chem.* **1998**, *37*, 1713 - 1719.
6. **Synthesis and Structure of Vanadate Esters of Glycerol and Propane-1,3-diol**  
S. P. Rath, K. K. Rajak, S. Mondal and A. Chakravorty  
*J. Chem. Soc., Dalton Trans* **1998**, 2097 - 2102.

5. **Chemistry of Hydrazonato Oxovanadium(V) Alkoxides Derived from Dihydric/Monohydric Alcohols**  
S. P. Rath, S. Mondal and A. Chakravorty  
*Inorg. Chim. Acta* **1997**, *263*, 247 - 253. (Invited article: R. H. Holm issue)
4. **Synthesis, Structure and Metal Redox of Alkoxide Bound Oxovanadium(V) Complexes Incorporating N-salicylidene/N-naphthalidene- $\alpha$ -aminoalcohols**  
S. P. Rath, T. Ghosh and S. Mondal  
*Polyhedron* **1997**, *16*, 4179 - 4186.
3. **Chemistry of Oxovanadium(V) Alkoxides: Synthesis and Structure of Mononuclear Complexes Incorporating Ethane-1,2-diol**  
S. Mondal, S. P. Rath, S. Dutta and A. Chakravorty  
*J. Chem. Soc., Dalton Trans* **1996**, 99 - 103.
2. **Mixed-Ligand Oxovanadium(V) Complexes Incorporating Bidentate Salicylaldehyde and Tridentate Aldimine Ligands**  
S. P. Rath, S. Mondal and T. Ghosh  
*Transition Met. Chem.* **1996**, *21*, 309 - 311.
1. **Water Soluble Mixed-Ligand Oxovanadium(IV) Complexes of Acetylacetonone and Aldimine Ligands**  
S. P. Rath, S. Mondal and T. Ghosh  
*Indian J. Chem.* **1996**, *35A*, 527 - 529.