

Posters will be on Display for the Entire Week.

Presenters are Requested to be Present at Their Poster the Last Half-Hour Break of the Evening.

**POSTER SESSION: CHEMICAL EVOLUTION TOWARDS THE TRANSITION OF LIFE
Price Center Ballroom East**

Gupta V. K.

[Photochemical Synthesis of Bioinspired inorganic-Organic Hybrid Protocell-Like Self-Sustaining Supramolecular Assemblies, "Jeewanu" in a Laboratory sSimulated Possible Prebiotic Atmosphere](#) [#4012]

Photosynergistic collaboration of non-linear coherent processes at mesoscopic level led to emergence of biomimetic hybrid supramolecular assemblies similar to Jeewanu capable of showing various functional properties viz. self-organisation and self-sustenance.

Wang W. Q. Gong G. Y. Shen X. C. Qiao B. H. Li J. J.

[Magnetic Field Dependence of Heat Capacity Study on the \(e-p\) Bose-Einstein Condensation Through the Hydrogen onto D, L-Valine Optical Lattice](#) [#4031]

For the aim to investigate the role of chirality and helicity between D- and L-valine crystal lattices under Debye temperature 2 K to 20 K, the magnetic field dependence of zero-field and 1, 3 and 5 Tesla on the heat capacity were measured.

Konstantinov K. K. Konstantinova A. F.

[Importance of Sedimentation for Chiral Symmetry Breaking in Far from Equilibrium Peptide Systems](#) [#4134]

Considered chiral symmetry breaking in complex far from equilibrium chemical systems. Shown that effective averaging of chemical reactions does not allow chiral symmetry breaking but it does not apply to phase transition during sedimentation process.

Zhao Y. F. Liu Y. Xu P. X. Han D. X.

[The Model for Genetic Code Origin Study Based on the Dipeptide Yields Variation with the Nucleosides](#) [#4028]

A simplified and effective chemical model containing phosphorous compounds, amino acids and nucleosides, was built up for the study the translation mechanism of genetic code origin.

Matsubara Y. J. Kaneko K.

[Optimal Size for Emergence of Self-Replicating Polymer System](#) [#4141]

For the origins of life, emergence of an active state with catalytic polymers synthesized by their own is necessary. We present a universal formula for the optimal system-size that minimizes the transition time for such state.

Myrgorodska I. Fletcher S. P.

[Induction of Asymmetry in Formose Reaction](#) [#4087]

In the present work we investigated influence of different chiral species, including amino acids and sugar derivatives, on the enantioselective outcome of the formose reaction.

Blokhuis A. W. P. Lacoste D. Nghe P.

[Thermodynamics of Sequence and Exploration in Prebiotic Scenarios](#) [#4004]

We study the thermodynamics of polymers with sequence, for exchange and ligation reactions. We show novel ways of obtaining long polymers and derive thermodynamic costs for exploration and maintenance. These costs strongly impact prebiotic scenarios.

Ikehara K.

[Necessities for the First Life to Emerge](#) [#4051]

For the first life to emerge, the first protein must be produced by random joining of amino acids in protein 0th-order structure. In addition, the first genetic code and the first double-stranded gene must encode the protein 0th-order structure.

Wong S. B. Gately M. Young E. Krishnamurthy R. Weber A. L. Campbell T.

[Pyrazine Nucleic Acids: From Small Molecules to Proto-Informational Polymers](#) [#4183]

Pyrazine nucleosides are derivable from amino acid amides and pentoses under plausibly prebiotic conditions. Pyrazines share features similar to adenine or thymine, and may behave as an informational polymer when polymerized as pyrazine nucleic acid.

Panchal Z. Oye M. Deamer D. Vercootere W.

[Non-Enzymatic Synthesis of Duplex Nucleic Acid](#) [#4209]

The earliest forms of life would likely have a protocellular form, with a membrane encapsulating some form of linear charged polymer that would have genetic properties; we simulate the plausible prebiotic conditions and use a nanopore for analysis.

Norkus R. Damer B. F. Deamer D. W.

[A Hot Spring Origin of Life and Early Adaptive Pathway from Woese Progenotes to Marine Stromatolites](#) [#4132]

An origin of life on land is visualized as: organic compounds accumulating in hydrothermal pools, wet-dry cycling of protocells encapsulating synthesized polymers, arising of a Woese progenote and its evolution into living microbial communities.

Kawamura K.

[Two Gene Hypothesis for the Initiation of Life-Like Systems Towards the RNA World](#) [#4049]

The minimum number of genes for initiation of life-like systems was deduced from the characteristics of RNA molecules and of life-like systems, and I propose what functions with RNA molecules were essential for emergence of life.

Mungi C. V. Singh S. Chugh J. Rajamani S.

[Synthesis and Characterization of Informational Molecules Formed Under Prebiotic Conditions](#) [#4068]

Effects of simple prebiotic conditions such as low pH, high temperature and dry heating on synthesis of RNA-like molecules is studied and chemical alternatives to modern RNA which may be stable under harsh conditions are suggested.

Kobayashi A. Fujishima K.

[Improving mRNA-Display for In Vitro RNA-Protein Co-Evolution](#) [#4084]

Optimization of mRNA-display using in vitro translation to achieve stable and efficient screening of the acquisition of primitive functional RNA-peptide complex through iterative optimization of the accompanying puromycin chemistry conditions.

Scanes R. J. H. Fletcher S. P.

[Design of Novel Asymmetric Autocatalytic Systems](#) [#4107]

Investigation into novel autocatalytic systems using organocatalysis.

Suárez-Marina I. Rodríguez-García M. Surman A. J. Cooper G. J. T. Cronin L.

[Automated Oligopeptide Formation Under Simple Programmable Conditions](#) [#4042]

Traditionally, prebiotic chemistry has investigated the formation of life's precursors under very specific conditions thought to be "plausible". Herein, we explore peptide formation studying several parameters at once by using an automated platform.

Conwell C. C. Parsons C. J. Grover M. A.

[Educating About Origins of Life Research: The Power of Collaboration](#) [#4170]

The Center for Chemical Evolution has a unique opportunity to pursue outreach and education related to origins of life research. Through a partnership, we have created four videos that have educated over 1 million viewers about scientific concepts.

Guillemin J. C. Trolez Y.

[Synthesis of Cyanoacetylenes for Photochemical and Spectroscopic Studies](#) [#4175]

Synthesis of cyanoacetylene derivatives, spectroscopic and photochemical studies.

Hawker J. Christensen E.

[Introduction to Astrobiology: A Model for Integrating Research into an Undergraduate Class](#) [#4187]

We describe a research based learning college course, co-taught by two instructors, that introduces undergraduate students, including non-science majors, to the field of Astrobiology.

Bonfio C. Valer L. Scintilla S. Shah S. Evans D. J. Jin L. Szostak J. W. Sasselov D. D.
Sutherland J. D. Mansy S. S.

[UV-Light Driven Prebiotic Synthesis of Iron-Sulfur Clusters](#) [#4016]

Photolysis and photooxidation drive the prebiotic synthesis of iron-sulfur peptides under model early Earth conditions.

Tirumalai M. R. Paci M. Tran Q. Marathe A. Chavan D. Dusi V. Fox G. E.

[Understanding Increase in Complexity in the RNA World Using a Two Enzyme System](#) [#4224]

The dynamics of the emergence of complexity in an RNA World is an important problem in the quest towards understanding the origins of life.