

Monday, April 24, 2017

POSTER SESSION II:

**ORIGIN AND EVOLUTION OF LIFE: PREBIOTIC CHEMISTRY:  
ELECTRON TRANSFER REACTIONS OF INTEREST TO ASTROBIOLOGISTS**

8:00 p.m. Main Hall

Rowe A. R. Xu S. Girgius P. Amend J. El-Naggar M.

[\*Mechanisms of Methanogenic Electron Uptake from Electrodes\*](#) [#3133]

We present data on developing electrochemical tests to resolve the mechanisms of electron uptake in a methanogen and understanding the biophysical basis.

Zacharoff L. Morrone D. Bond D. El-Naggar M.

[\*PgcA: A Protein Specific to Iron Oxide Reduction by Geobacter Sulfurreducens\*](#) [#3152]

Electrochemical, microbiological, and biochemical demonstrations of a bacterial interaction specific to insoluble iron oxide reduction and not electrodes.

Bose A.

[\*Understanding the Role of Microbial Oxidative Extracellular Electron Transfer in Biogeochemical Cycles\*](#) [#3153]

Oxidative extracellular electron transfer is a newly discovered capability that changes our perception of the role of microbes in nature.

Whitehead H. D. LeBlanc G. Wirth D. M. Yungbluth J. Ludewick G. Barge L. M. Cameron R. D.

[\*Unique Electrochemical Cells for the Analysis of Hydrothermal Vent Prebiotic Chemistry Experiments\*](#) [#3208]

Here we use 3D printing to design electrochemical cells and components to standardize formation and characterization of hydrothermal vent mimics.

Wirth D. M. LeBlanc G. Whitehead H. D. Yungbluth J. Ludewick G. Barge L. M. Cameron R. D.

[\*Electrochemical Deposition of Iron Sulfides and Iron Hydroxides: Mimicking Hydrothermal Vent Systems Relevant to Origin of Life Studies\*](#) [#3210]

Electrochemical methods for interfacing mineral membranes with electrodes in order to evaluate their electrochemical properties.

Herschy B. Sampson J. Atlas Z. Abbot-Lyon H. Kee T. P. Pasek M. A.

[\*Redox Controls on Phosphorus Availability in the Archaean\*](#) [#3274]

This work looks at how iron redox chemistry may have affected the availability of phosphorus in the early Archaean ocean.

Jangir Y. Karbelkar A. Zinke L. Reese B. K. Wanger G. Anderson C. Amend J. P. El Naggar M. Y.

[\*In Situ Electrochemical Enrichment of Subsurface Bacteria at the Sanford Underground Research Facility\*](#) [#3315]

We describe a potentiostatically controlled in situ electrochemical reactor to enrich for mineral oxidizing and reducing bacteria from the Earth's subsurface.

Szeinbaum N. Hui L. Brandes J. A. Taillefert M. Glass J. B. DiChristina T. J.

[\*Microbial Manganese\(III\) Reduction Fueled by Anaerobic Acetate Oxidation\*](#) [#3403]

We isolated a microbe that mediates a novel metabolism, acetate oxidation coupled to manganese(III) reduction, using an oxygen tolerant TCA cycle.

McCarver A. C. Lessner F. H. Lessner D. J.

[\*The Origins and Evolution of Intracellular Redox Systems in Methanogens\*](#) [#3422]

This work reveals that the majority of extant methanogens evolved to utilize a NADPH-dependent thioredoxin system for intracellular redox homeostasis.

Cameron R. D. Chin K. Flores E. LeBlanc G. Barge L. M.

[\*Simulating Electrochemistry of Iron-Nickel Sulfide Hydrothermal Chimneys\*](#) [#3502]

We conducted electrochemical experiments to investigate catalytic properties of simulated iron-nickel sulfide hydrothermal chimneys.

Deere T. M. Lessner F. H. Duin E. C. Lessner D. J.

[\*Building an Ancient Cofactor: Iron-Sulfur Cluster Biogenesis in Methanogenic Archaea\*](#) [#3507]

We describe a system for iron-sulfur cluster biogenesis in *Methanosarcina acetivorans*, a member of an evolutionarily ancient lineage, the methanogenic archaea.

Garber A. G. Chan C. S. C.

[\*Cytochrome C<sub>yc2</sub>: Role in Extracellular Electron Transfer\*](#) [#3661]

In this study, we aim to better understand the role of outer membrane cytochrome C<sub>yc2</sub> in extracellular electron transfer reactions, specifically iron oxidation.

Garber A. G. Hanahan B. H. Santoleri D. S. Rozovsky S. R. Chan C. S. C.

[\*Biochemical Mechanisms of Neutrophilic, Chemolithoautotrophic Iron Oxidation\*](#) [#3685]

This study aims to biochemically characterize the outer membrane cytochrome C<sub>yc2</sub> from neutrophilic, chemolithoautotrophic *Mariprofundus ferroxydans* PV-1.

Aguirre V. Jr Churchman S. Baum M. M. VanderVelde D. Barge L. M.

[\*Nitrate Reduction In Prebiotic Chemistry\*](#) [#3723]

The process of nitrate reduction by green rust which existed on the early Earth and its potential role in prebiotic chemistry, their synthesis, and analysis.

Szeinbaum N. Zhao S. Tang Y. Henny C. Crowe S. A. Stewart F. J. DiChristina T. J. Glass J. B.

[\*Manganese Biosignatures: Mn\(III\) Mineral Formation During Mn\(IV\) Oxide Reduction\*](#) [#3369]

Manganese(III) containing minerals could be important biosignatures for microbial Mn(IV) reduction.