

Emerson Center Lectureship Award Symposium

Fundamental principles of and multi-disciplinary approaches to Nitrogen fixation



March 26, 2013, Harland Cinema,
Dobbs University Center, Emory University

AWARD WINNER &: **Prof. Richard R. Schrock, MIT**
KEYNOTE SPEAKER **2005 Nobel Laureate in Chemistry**



Reduction of Dinitrogen Catalytically to Ammonia with Protons and Electrons

In 2003 we reported the first catalytic reduction of dinitrogen with protons and electrons. The process employs a molybdenum complex $[\text{HIPTN}_3\text{N}]\text{Mo}$. Dinitrogen is bound end-on to Mo-center and is reduced through a stepwise addition of protons and electrons. Dinitrogen is reduced in heptane to yield 7-8 equivalents of NH_3 with the remaining electrons being used to make dihydrogen. Eight of the proposed intermediates in the Chatt-like reduction sequence have been isolated and characterized crystallographically and extensive calculations of the mechanism of reduction in the $[\text{HIPTN}_3\text{N}]\text{Mo}$ system support the proposed mechanism. Later, we reported a second example of the catalytic reduction of dinitrogen by utilizing the $[\text{Mo}(\text{L})(\text{N}_2)_2]_2(\mu\text{-N}_2)_2$ (where L is a "PNP pincer" ligand) catalyst. After approximately 45 years of research in catalytic reduction of dinitrogen to ammonia, only these two catalytic reductions of dinitrogen are known. Both employ Mo catalysts, an acid that is readily reduced, and an organometallic reducing agent.



INVITED SPEAKERS

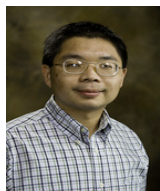
EVENTS SCHEDULE



Jamal Musaev
Emerson Center for
Scientific Computation,
Emory University



Brian Hoffman
Department of
Chemistry,
Northwestern University



Nan Zheng
Department of
Chemistry and
Biochemistry, University
of Arkansas

12:00–1:30

POSTER PRESENTATIONS

1:30 – 1:40

COFFEE BREAK

1:40 – 2:00

OPENING CEREMONY & AWARD PRESENTATION

2:00 – 3:00

R. R. Schrock: *Reduction of Dinitrogen Catalytically to Ammonia with Protons and Electrons*

3:00 – 3:55

J. Musaev: *Knowledge-based Catalyst Designing: Dinitrogen Hydrogenation*

3:55 – 4:10

COFFEE BREAK

4:10 – 5:05

B. Hoffman: *How Nature does N_2 reduction*

5:05 – 6:00

N. Zheng: *Photoinduced Cleavage of N-N Bonds of Aromatic Hydrazines and Hydrazides:*

6:00

CLOSING

6:30 – 9:00

DINNER (by invitation)

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REGISTRATION:

<http://www.emerson.emory.edu/conferences/form/register.html>

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Registration is free. Please register to attend.

Abstracts of invited talks are available online