

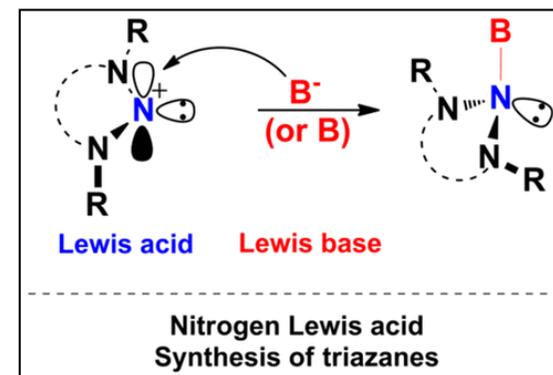
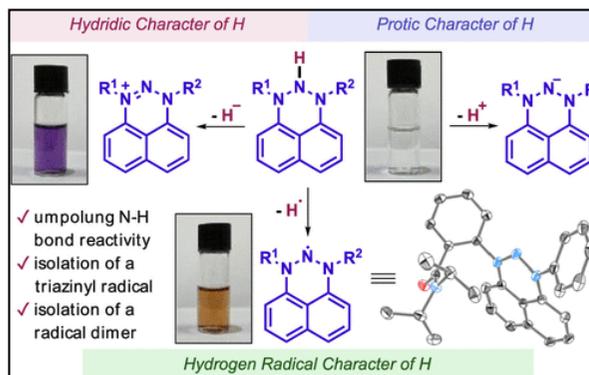
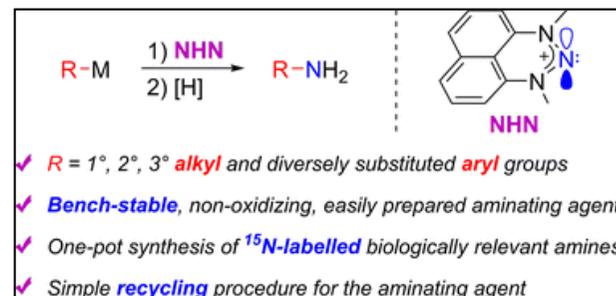
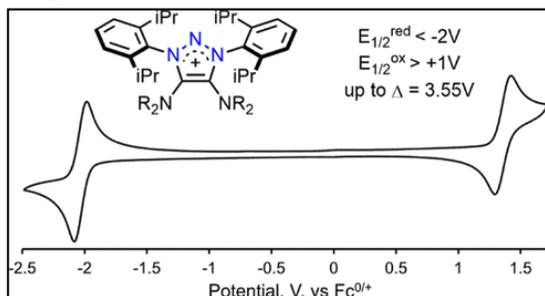
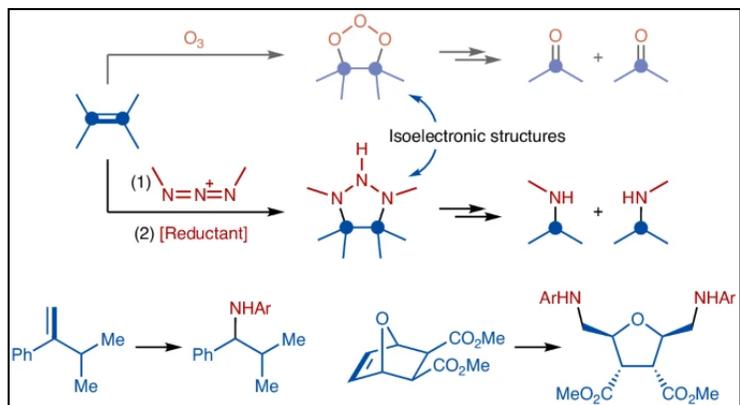
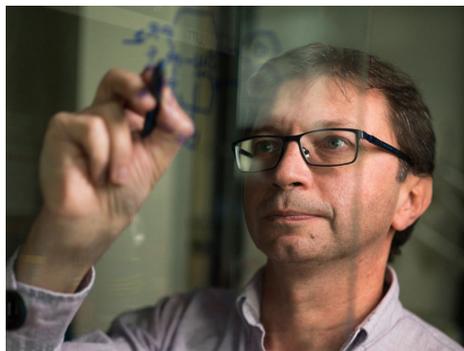
第96回有機元素化学セミナー

The 96th Organoelement Seminar Series

Prof. Mark Gandelman

(Technion, Israel Institute of Technology, Israel)

"N-Heterocyclic Nitrenium Ions: a New Chemical Space for Exciting Discoveries"



This lecture will introduce the versatile chemistry of N-heterocyclic nitrenium ions (NHNs), nitrogen-based analogues of N-heterocyclic carbenes. The speaker will discuss the coordination ability and fundamental properties of these unusual cationic ligands, as well as their function as a unique class of nitrogen-based Lewis acids. The lecture will also highlight the reactivity of NHNs in organocatalysis, frustrated Lewis pair chemistry, radical processes, and a triazenolysis reaction.

16:30-18:00, March 13 (Fri), 2026@Room M-123 (1st floor, main building, Institute of Science Tokyo)
Host: Makoto Yamashita (Sch. of Sci.) (yamashita.m.6dbb@m.isct.ac.jp)

Abstract

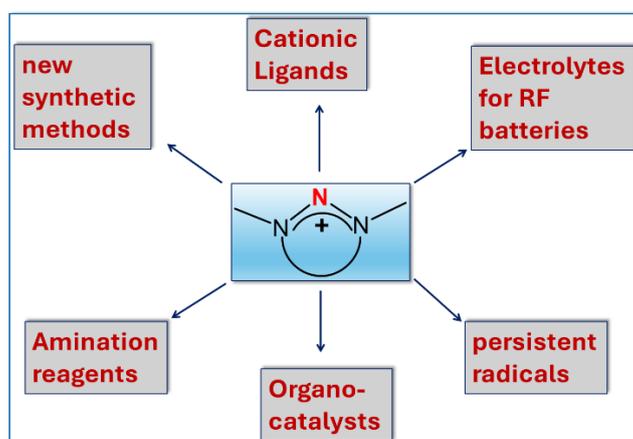
N-Heterocyclic Nitrenium Ions: a New Chemical Space for Exciting Discoveries

Mark Gandelman

Technion – Israel Institute of Technology, Haifa, Israel

e-mail: chmark@technion.ac.il

In my lecture, we will discuss versatile chemistry of N-Heterocyclic Nitrenium ions (NHNs) – the nitrogen-based analogs of ubiquitous N-Heterocyclic Carbenes. We will demonstrate coordination ability of these unusual cationic ligands, analyze their properties and their utilization in stabilization of elusive species.^{1,2} We will demonstrate that nitrenium ions constitute an unprecedented class of nitrogen-based Lewis acids.³ We will discuss versatile and intriguing reactivity of NHNs in organocatalysis, frustrated Lewis pairs chemistry⁴ and radical-based chemistry.⁵ In addition, we will reveal how the fundamental understanding of the nitrenium properties led us to the development of *triazenolysis* reaction - an *aza*-version of the canonical alkene ozonolysis.⁶



[1] *Nat. Chem.* **2011**, *5*, 525.

[2] *Chem.Sci.* **2014**, *5*, 1305.

[3] *J. Am. Chem. Soc.* **2017**, *139*, 4062.

[4] *Angew. Chem. Int. Ed.* **2020**, *59*, 23476.

[5] *J. Am. Chem. Soc.* **2022**, *144*, 23642.; *J. Am. Chem. Soc.* **2024**, *146*, 19474.

[6] *Nat. Chem.* **2025**, *17*, 101.

Curriculum Vitae

PERSONAL DETAILS

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Website: <https://markgandelman.technion.ac.il/>

ACADEMIC DEGREES

1996-1997 Direct PhD program, Dept. of Organic Chemistry
and 1999-2003 The Weizmann Institute of Science, Rehovot, Israel.
1992-1995 B.Sc. degree in chemistry (cum laude), Tel-Aviv University,
Department of Chemistry, Tel-Aviv, Israel

ACADEMIC APPOINTMENTS

2020-present Full Professor, Schulich Faculty of Chemistry, Technion.
2012-2020 Associate Professor, Schulich Faculty of Chemistry, Technion-Israel
Institute of Technology.
2005-2012 Assistant Professor, Schulich Faculty of Chemistry, Technion-Israel
Institute of Technology.
2003-2005 Rothschild Postdoctoral Research Associate, Harvard University,
Cambridge, MA, USA

RESEARCH INTERESTS

Organic/Organometallic Chemistry. Catalysis.

Research interests encompass areas of organic and organometallic chemistry, design of novel metal-based systems with fundamentally and practically important properties with a main emphasis on their use in the development of new versatile efficient catalytic methods.

FELLOWSHIPS, AWARDS AND HONORS

1998 Award of Scientific Excellence, IDF
1999 Engineering Medal (TZALASH), IDF
2003 Rothschild Fellowship for postdoctoral studies
2005 Coleman-Cohen Academic Lectureship
2005 Fellow of the Caesarea Fund
2009 Alfred & Yehuda Weissman Award for Excellence in Teaching
2010 Junior Scientists Participation (JSP) Fellowship. "Burgenstock" Conference.
2011 Friedenbergs Prize, Israel Academy of Sciences and Humanities
2012 The Gutwirth Award for Excellence in Research
2012 Henri Taub Award for Academic Excellence
2012 Technion Award for Excellence in Teaching (top 4% of lecturers)
2013 Schulich Prize for Excellence in Enhancing the Understanding of Chemistry
2014 Klein Prize for excellence in research
2014 Yanai Prize for Enhancing of Academic Education
2017 David Dodi Ben-Aharon Research Prize

2017 Hershel Rich Technion Innovation Award
2017 Sanford Kaplan Prize
2017 Joseph and Patricia Vanderslice Lecturer in Organic Chemistry (Boston College)
2022 The Abronson Family Chair in Chemistry
2024 Technion Award for Excellence in Teaching (top 4% of lecturers)
2024 The Israel Chemical Society–Adama Prize for Technological Innovation
2025 Technion Award for Excellence in Teaching (top 4% of lecturers)
2025 Zen-ichi Yoshida Lectureship Award (International Organic Chemistry Foundation of Japan).
2026 Visiting Fellowship Award (Tokushima University, Japan)

PUBLIC PROFESSIONAL ACTIVITIES

Reviewer for Nature Chem., Nature Commun., JACS, Angew. Chem., Chem. Sci., JOC, Org. Lett., Organometallics, Chem. Eur. J., etc.
Grants Reviewer for numerous granting agencies
Served as a member of the national granting committees
Guest Editor of the Israel Journal of Chemistry, 2010.
Editor of two books (The Chemistry of Functional Groups, The Patai's series)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Israel Chemical Society