

Date: 03/06/2021

RESUME

1. PERSONAL DETAILS

Full Name: David Eisenberg
Identity No: 304331234
Date and place of birth: 16.5.1984, Ukraine
Marital status: Married + 6 children
Phone numbers: +972-58-7005418
E-mail: eisenberg@technion.ac.il
Lab website: www.david-eisenberg.com
Twitter: [@EisenbergEchem](https://twitter.com/EisenbergEchem)

2. ACADEMIC DEGREES

2011 PhD, Chemistry, Hebrew University of Jerusalem, Israel.
2006 MSc, Chemistry, Hebrew University of Jerusalem, Israel.
2005 BSc, Chemistry, Hebrew University of Jerusalem, Israel.

3. ACADEMIC APPOINTMENTS

2017– Assistant Professor, PI, Schulich Faculty of Chemistry,
Technion–Israel Institute of Technology, Israel.
2015–2017 Post-doctoral researcher, Heterogeneous Catalysis and Sustainable Chemistry,
University of Amsterdam, the Netherlands.
2012–2015 Post-doctoral researcher, Chemistry and Chemical Engineering,
University of Texas at Austin, USA.

4. PROFESSIONAL EXPERIENCE (outside academia)

2006–2012 Team Leader, Department of Advanced Materials, Rafael Advanced Defense
Systems, Israel.
2007–2010 Small business founder and manager, “Professite | web-design for academia”.

5. RESEARCH INTERESTS (briefly)

We study how electricity drives chemical reactions – particularly those that store and release energy. Working at the interface between electrochemistry and materials science, we develop electrocatalysts for alternative fuels and for better fuel cells. We focus on the fundamental understanding of electrocatalytic mechanisms, mass transport in catalysts, and synthesis–structure–activity correlations in new materials.

6. TEACHING EXPERIENCE

Inorganic Chemistry (undergraduate, Technion). New design.
Analytical Chemistry for Engineering Majors (undergraduate, Technion).
Electrochemistry (graduate, Technion). Design of new advanced course.
Analytical Chemistry labs for Chemistry / Chem. Eng. (undergraduate, Technion). Supervision.
Physical Chemistry, teaching assistant.
General Chemistry lab, instructor.

7. TECHNION ACTIVITIES

N/A.

8. DEPARTMENTAL ACTIVITIES

2018– Representative at the Department of Chemical Engineering.

2017– Academic Secretary, Schulich Faculty of Chemistry.

9. PUBLIC PROFESSIONAL ACTIVITIES

2021 Guest Editor, Israel Journal of Chemistry, special issue on Electrochemistry

2019– Israel Electrochemical Society, Technion representative in Board of Directors and treasurer

2017– Reviewer for grant proposals from Pazy Foundation (Israel), Chateaubriand Foundation (France), Flanders Research Foundation (Belgium), and internal Technion grants and prizes (GTEP, GTIIT, RBNI, Waterloo, SPIRA).

2016– Reviewer for peer-reviewed journals, including: Nature Communications, Advanced Materials, Tetrahedron, ACS Catalysis, ACS Applied Energy Materials, Journal of Physical Chemistry, Journal of Colloids and Surfaces, Electrocatalysis, Journal of the Electrochemical Society, Journal of Catalysis, Journal of Electroanalytical Chemistry

10. MEMBERSHIP IN PROFESSIONAL SOCIETIES

Israel Electrochemical Society

The Electrochemical Society

International Society for Electrochemistry

Materials Research Society

Israel Chemical Society

11. FELLOWSHIPS, AWARDS AND HONORS

2021 Excellence in Teaching, Technion, Winter 2021

2020 Highest Excellence in Teaching, Technion, Winter 2020

2019 Emerging Investigators 2019 Issue of the Journal of Materials Chemistry A (invited)

2019 Schulich Faculty Prize for Excellence in Teaching

2019 Fulbright Fellow Travel Award (received by 7 out of 45 nominees)

2019 Excellence in Teaching, Technion, Winter 2019

2012–2013 Ilan Ramon Postdoctoral Fellowship, awarded to one Fulbright Fellow annually

2012–2013 Fulbright Postdoctoral Fellowship

2011 Excellence in Research Award, Department of Advanced Materials, Rafael, Israel

2010 Levine-Jortner Prize for Excellent PhD Students

2010 Special Distinction, FameLab science popularization competition, Israel

2009 Best Poster Award, ISNA-14 Symposium, Luxembourg

12. GRADUATE STUDENTS**Completed PhD theses**

N/A

PhD theses in progress

- 2017–2023 Eliyahu Farber, PhD direct track (passed candidacy exam),
“Designing Carbon Electrocatalysts with Lung-type Porosity”.
- 2017–2024 Tomer Burshtein, PhD direct track (passed candidacy exam),
“Hydrazine Oxidation Reaction on Carbide-Carbon Composites”.
- 2020–2024 Inbal Offen-Polak, PhD candidate,
“Breaking New Paths into Electrocatalytic Ammonia Oxidation”.

MSc theses in progress

- 2020–2022 Shir Tabac, “Flow design in carbon electrocatalysts”
- 2020–2022 Yair Shahaf, “Orthogonal design of carbon electrocatalyst supports”
- 2020–2022 Noam Zyser, “Elucidating the mechanism of urea electro-oxidation”
- 2021–2023 Nicola M. Seraphim, “Pore tuning in carbons for photo-electrochemistry”

13. SPONSORED LONG-TERM VISITORS AND POST-DOCTORAL ASSOCIATES

- 2020– Dr. Siniya Mondal (IIT Kharagpur), post-doctoral fellow.
- 2020– Dr. Karina Ioffe (Russia), research fellow.
- 2019–2020 Dr. Sankalpita Chakraparty (IIT Delhi), post-doctoral fellow.
- 2018–2019 Dr. Kasinath Ojha (IIT Delhi), post-doctoral fellow.

14. RESEARCH GRANTS**Competitive**

- 2020–2024 **Pazy Foundation** (~200k NIS x 4y), co-PI Dr. Amir Weitz, Rafael
“Fuel Cells based on Alternative Fuels: Rational Design of Multi-Doped Catalysts for the Electro-Oxidation of Urea”
- 2019–2023 **Israel Science Foundation** (250k NIS x 4y + 100k Infrastructure Grant),
“Carbide-Carbon Electrocatalysts for Hydrazine Oxidation”
- 2020 **Young GIF (German-Israeli Foundation)** (22,000 euro),
“Designing Flow in Electrocatalysts”
- 2019–2021 **Israel Ministry of Energy** (145k NIS x 3y),
“Electrocatalysis for Energy: Solving the Flow Challenge”
- 2018–2020 **Israel Ministry of Energy** (156k NIS x 3y), co-PI Prof. Lior Kornblum,
Technion, “Hydrogen on Demand: Catalyst Development for New Hydrogen Carriers”

Industrial and other sources

- 2020–2021 Member of the **Israel National Research Center for Electrochemical Propulsion** (100k x 2y).

15. PUBLICATIONS

Theses

1. **D. Eisenberg**, “Electronic and Supramolecular Phenomena in Oligocorannulenes”, Ph.D. thesis, Hebrew University of Jerusalem, **2011**.
2. **D. Eisenberg**, “Bicorannulenyl (C₄₀H₂₀): Dynamic stereochemistry and anions”, M.Sc. thesis, Hebrew University of Jerusalem, **2006**.

Refereed papers in professional journals

Legend: * denotes corresponding author, underline denotes supervised student

1. I. Aprahamian, **D. Eisenberg**, R. E. Hoffman, T. Sternfeld, Y. Matsuo, E. D. Jackson, E. Nakamura, L. T. Scott, T. Sheradsky, M. Rabinovitz, “Ball-and-socket stacking of supercharged geodesic polyarenes: Bonding by interstitial Li ions”, *J. Am. Chem. Soc.*, *127*, 9581-9587, **2005**.
2. **D. Eisenberg**, A. S. Filatov, E. A. Jackson, M. Rabinovitz, M. A. Petrukhina, L. T. Scott, R. Shenhar, “Bicorannulenyl. Stereochemistry of a C₄₀H₁₈ biaryl composed of two chiral bowls”, *J. Org. Chem.*, *73*, 6073-6078, **2008**. **Featured on the front cover.**
3. **D. Eisenberg**, J. M. Quimby, E. A. Jackson, L. T. Scott, R. Shenhar, “The bicorannulenyl dianion: A charged overcrowded ethylene”, *Angew. Chem. Int. Ed.*, *122*, 7700-7704, **2010**.
4. **D. Eisenberg**, J. M. Quimby, E. A. Jackson, L. T. Scott, R. Shenhar, “Highly charged supramolecular oligomers based on the dimerization of corannulene tetraanion”, *Chem. Commun.*, *47*, 9010-9012, **2010**.
5. I. Davidi, A. Semionov, **D. Eisenberg**, G. Goobes, R. Shenhar, “Supramolecular comb polymer structure and unique mesomorphic behavior induced by aromatic stacking between PVP and palladium pincer surfactants”, *Soft Matter*, *8*, 7393-7401, **2012**.
6. **D. Eisenberg**, J. M. Quimby, D. Ho, R. Lavi, L. Benisvy, L. T. Scott, R. Shenhar, “Special electronic structure and extended supramolecular oligomerization of anionic 1,4-dicorannulenylbenzene”, *Eur. J. Org. Chem.*, 6321-6327, **2012**. **Featured on the front cover.**
7. **D. Eisenberg**, J. M. Quimby, L. T. Scott, R. Shenhar, “1,3,5-Tricorannulenylbenzene: stereochemistry, reduction and supramolecular dimerization of a branched oligocorannulene”, *J. Phys. Org. Chem.*, *26*, 124-130, **2013**.
8. **D. Eisenberg**, H. S. Ahn, A. J. Bard, “Enhanced photoelectrochemical water oxidation on BiVO₄ by electrodeposition of α-TiO₂”, *J. Am. Chem. Soc.*, *136*, 14011-14014, **2014**.
9. **D. Eisenberg***, “Imaging the anisotropic reactivity of a tungsten diselenide photocathode”, *ChemElectroChem*, *2*, 1259-1263, **2015**.
10. **D. Eisenberg***, W. Stroek, N. J. Geels, C. S. Sandu, A. Heller, N. Yan, G. Rothenber*, “A simple synthesis of an N-doped carbon ORR catalyst: Hierarchical micro/meso/macro porosity and graphitic shells”, *Chem. – Eur. J.*, *22*, 501-505, **2016**.

11. A. J. E. Rettie, W. D. Chemelewski, B. R. Wygant, J. Lindemuth, J.-F. Lin, **D. Eisenberg**, S. Bauer, T. J. Johnson, R. D. Ash, X. Li, J. Zhou, C. B. Mullins, “Synthesis, electronic transport and optical properties of Si: α -Fe₂O₃ single crystals”, *J. Mater. Chem. C*, 4, 559-567, **2016**.
12. T. K. Slot, **D. Eisenberg**,* D. van Noordenne, P. Jungbacker, G. Rothenberg, “Cooperative catalysis for selective alcohol oxidation with molecular oxygen”, *Chem. – Eur. J.*, 22, 12307-12311, **2016**. Featured in SynFacts, 2016, 12, 1212.
13. **D. Eisenberg**,* W. Stroek, N. J. Geels, S. Tanase, M. Ferbinteanu, S. J. Teat, P. Mettraux, N. Yan, G. Rothenberg, “A rational synthesis of hierarchically porous, N-doped carbon from Mg-based MOFs: understanding the link between nitrogen content and oxygen reduction electrocatalysis”, *Phys. Chem. Chem. Phys.*, 18, 20778-20783, **2016**.
14. **D. Eisenberg**,* P. Prinsen, N. J. Geels, W. Stroek, N. Yan, B. Hua, J.-L. Luo, G. Rothenberg, “The evolution of hierarchical porosity in self-templated nitrogen-doped carbons and its effect on oxygen reduction electrocatalysis”, *RSC Adv.*, 6, 80398-80407, **2016**.

From Technion:

15. J. Biemolt, I. M. Denekamp, T. K. Slot, G. Rothenberg, **D. Eisenberg***, “Boosting the supercapacitance of nitrogen-doped carbon by tuning surface functionalities”, *ChemSusChem*, 10, 4018-4024, **2017**. Featured on the cover.
16. T. K. Slot, **D. Eisenberg**,* G. Rothenberg, “Cooperative surface-particle catalysis: the role of the “active doughnut” in catalytic oxidation”, *ChemCatChem*, 10, 2219-2124, **2018**.
17. **D. Eisenberg**,* T. K. Slot, G. Rothenberg, “Understanding Oxygen Activation on Metal-and Nitrogen-Codoped Carbon Catalysts”, *ACS Catal.*, 8, 8618-8629, **2018**.
18. K. Ojha, E. M. Farber, T. Y. Burshtein, **D. Eisenberg**,* “A Multi-Doped Electrocatalyst for Efficient Hydrazine Oxidation”, *Angew. Chem. Int. Ed.*, 57, 17168-17172, **2018**.
19. T. Y. Burshtein, E. M. Farber, K. Ojha, **D. Eisenberg**,* “Revealing structure–activity links in hydrazine oxidation: doping and nanostructure in carbide–carbon electrocatalysts”, *J. Mater. Chem. A*, 7, 23854-23861, **2019**. Invited contribution for Emerging Investigators 2019 issue, as featured in J. Mater. Chem. A., 7, 23267.
20. E. M. Farber, K. Ojha, T. Y. Burshtein, **D. Eisenberg**,* “Carbon electrocatalysts for hydrazine oxidation: Self-templating design of hierarchical porosity using barium carbonate nanoparticles”, *J. Electrochem. Soc.*, 167, 064517, **2020**.
21. E. M. Farber, K. Ojha, T. Y. Burshtein, L. Hasson, **D. Eisenberg**,* “Understanding the self-templating of hierarchically porous carbon electrocatalysts using Group 2 coordination polymers”, *Mater. Adv.*, 1, 20-33, **2020**. Featured on the journal cover.
22. S. Chakrabarty,⁼ I. Offen-Polak,⁼ T. Y. Burshtein, E. M. Farber, **D. Eisenberg**,* “Urea oxidation electrocatalysis on nickel hydroxide: the role of disorder”, *J. Solid State Electrochem.*, 25, 159-171, **2021**. Invited contribution.

23. **S. Tabac, D. Eisenberg,*** “Pyrolyze this paper: can biomass become a source for precise carbon electrodes?”, *Curr. Opinion Electrochem*, 100638, **2021**. **Invited contribution**.
24. R. Uwayid, **N. M. Seraphim**, E. N. Guyes, **D. Eisenberg**, M. E. Suss,* “Characterizing and mitigating the degradation of oxidized cathodes during capacitive deionization cycling”, *Carbon*, 173, 1105-1114, **2021**.
25. **T. Y. Burshtein,**⁼ I. Agami,⁼ **M. Sananis**, C. E. Diesendruck,* **D. Eisenberg,*** “Template-free formation of regular macroporosity in carbon materials made from a folded polymer precursor”, *Small*, *in press*, **2021**.

Review papers

1. **D. Eisenberg**, R. Shenhar, M. Rabinovitz, “Synthetic approaches to aromatic belts: Building up strain in macrocyclic polyarenes”, *Chem. Soc. Rev.*, 39, 2879-2890, **2010**.
2. **D. Eisenberg**, R. Shenhar, “Polyarene anions: Interplay between theory and experiment”, *Wiley Interdisc. Rev.– Comp. Molec. Sci.*, 2, 525-547, **2012**. **Invited review article**.

Book Editor

D. Eisenberg (volume editor), “Porous Materials for Energy Applications”, Volume 4 in the Handbook of Porous Materials, World Scientific Publishing, **2020**.

Chapters in books

D. Eisenberg, R. Shenhar, M. Rabinovitz – “Anions of Buckybowls”, Chapter 3 in “Fragments of Fullerenes and Carbon Nanotubes: Designed Synthesis, Unusual Reactions, and Coordination Chemistry”, Eds. L. T. Scott, M. A. Petrukhina, *Wiley*, **2011**.

Refereed papers in conference proceedings

N/A.

Patents

1. A. Heller, J.-W., Lee, **D. Eisenberg**, K. A. Friedman, S. Coffman, “Low temperature pyrolysis of organic salts providing graphene rich carbons”, US Patent Application 16/089290, PCT published WO **2017/172800**.
2. **D. Eisenberg**, **E. M. Farber** “Electrocatalysts with Branched-type Porosity”, PCT IL2019/050812, filed 07/2019, priority date 07/**2018**, decided to pursue US patent (11/2020).
3. **D. Eisenberg**, **K. Ojha**, **T. Y. Burshtein** “Hydrazine oxidation catalysts”, PCT filed 07/2019, priority date 07/**2018**, decided not to pursue international patents (12/2020).
4. **E. M. Farber**, **T. Y. Burshtein**, **D. Eisenberg** “Carbon-alkaline earth metal catalysts for hydrazine oxidation”, PCT filed 11/**2019**, decided to pursue US patent (11/2020).

Research reports and other publications

N/A.

16. CONFERENCES

Plenary, keynote or invited talks

1. **Invited talk**. “Carbon Electrocatalysts”, *German-Israeli Battery School*, Hadera (Israel). **2017**.

2. Invited talk. “Carbon Electrocatalysts for Energy Applications”, *IFCC*, Haifa (Israel). **2017**.
3. Invited talk. “Improving Flow in Carbon Catalyst Layers”, *IFCC*, Ramat-Gan (Israel). **2018**.
4. Invited talk. “Mass Transport in Electrocatalysis”, *IsraElectrochem*, Beer Sheva (Israel). **2019**.
5. **Keynote invited talk**. “Hierarchical Porosity in Electrocatalysts”, *Telluride Workshop on PGM-free Electrocatalysts*, Telluride (USA). **2020**.
6. Invited talk. “The Challenges of Hierarchical Porosity”, *Urban Mobility*, Haifa (Israel). **2020**.

Contributed Oral Presentations

1. “Enhanced photoelectrochemical water oxidation on BiVO₄ by electrodeposition of a-TiO₂”, *Israel Chemical Society 80th Meeting*, Tel Aviv (Israel). **2015**.
2. “A Simple Synthesis of an N-Doped Carbon ORR Catalyst: Hierarchical Pores and Graphitic Walls”, *Electrochemical Society Meeting*, Glasgow (United Kingdom). **2015**.
3. “A Practical Approach to Metal-Free Oxygen Reduction Electrocatalysts”, *Israel Materials Engineering Conference (IMEC17)*, Ramat-Gan (Israel). **2016**.
4. “A Practical Approach to Tunable Oxygen Reduction Catalysts from Mg-Based MOFs”, *International Society of Electrochemistry 67th Meeting*, The Hague (The Netherlands). **2016**.
5. “Designing Microstructure in Carbon Electrocatalysts”, *International Society for Electrochemistry 69th Meeting*, Bologna (Italy). **2018**.
6. “Multi-doped electrocatalysts for hydrazine oxidation”, *Israel Chemical Society 84th Meeting*, Tel Aviv (Israel). **2019**.
7. “Improving Flow in Catalyst Layers: the Nanostructure Challenge”, *IFCC 4th Annual Meeting*, Ramat-Gan (Israel). **2019**.
8. “Hydrazine oxidation electrocatalysis: Activity and Mass Transport”, *Catalysis – Small Molecules, Big Challenges*, Haifa (Israel). **2019**.
9. “Unexpected Effects of Doping on Carbon Electrocatalysts for Hydrazine Oxidation”, *The Netherlands' Catalysis and Chemistry Conference (NCCC)*, Noordwijkerhout (The Netherlands). **2020** (accepted, not presented due to COVID19).
10. “Unexpected Effects of Doping on Carbon Electrocatalysts for Hydrazine Oxidation”, *The Israel Vacuum Society (IVS-IPSTA) Conference (ONLINE)*, **2020**.
11. “Hydrazine Oxidation Electrocatalysis on Multi-Doped Carbons: Who Does What?”, *MRS Spring Meeting (ONLINE)*, **2021**.
12. “Hydrazine Oxidation Electrocatalysis on Multi-Doped Carbons: Who Does What?”, *239th Meeting of the Electrochemical Society, (ONLINE)*, **2021**.

Departmental seminars

Gave invited departmental seminars in Caltech (USA), Cornell University (USA), École Polytechnique (France), École Polytechnique Fédérale de Lausanne (Switzerland), and more.

Participation in organizing conferences

Initiated and co-organized a new international conference: *Catalysis – Small Molecules, Big Challenges*, Technion, Haifa (Israel), 09-11 September 2019, ~120 participants, ~20 international speakers.