

Adam Jaffe

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Professional Appointments

Assistant Professor of Materials Chemistry

Research Focus: combining synthetic molecular and solid-state chemistries to tune stable crystalline solids and produce new hybrid materials

Affiliated Faculty, ND Energy

Affiliated Faculty, ND Nano

University of Notre Dame (2021 –)

University of Notre Dame (2021 –)

University of Notre Dame (2021 –)

Education and Research Experience

NIH Postdoctoral Fellow (*Advisor:* Prof. Jeffrey R. Long)

Postdoctoral Research Focus: O₂ separation from air using metal–organic frameworks

NIH Postdoctoral Fellowship Focus: Lithium adsorption and desorption in porous materials

UC Berkeley (2017 – 2021)

(2017 – 2021)

(2019 – 2021)

Ph.D. in Inorganic Chemistry (*Advisor:* Prof. Hemamala I. Karunadasa)

Thesis: Structural and Electronic Correlations in Hybrid Materials: High-Pressure Behavior, Optoelectronic Properties, and Energy-Storage Capabilities

Stanford University (2012 – 17)

A.B. in Chemistry *summa cum laude* (*Advisor:* Prof. Andrew B. Bocarsly) with a Certificate in Materials Science

Thesis: Anode Catalysts and the Electrooxidation Mechanism in Direct Ethanol Fuel Cells

Princeton University (2008 – 12)

Distinctions

National Science Foundation CAREER Award (Division of Materials Research)

NSF (2023)

Ruth L. Kirschstein National Research Service Award Individual Postdoctoral Fellowship (F32)

NIH: NIGMS (2019)

ACS Division of Inorganic Chemistry Young Investigator Award

ACS-DIC (2018)

Featured Article in JACS Young Investigator Virtual Issue

ACS (2017)

William S. Johnson Fellowship

Stanford University (2016)

Stanford Interdisciplinary Graduate Fellowship

Stanford University (2013)

Grand Prize in Princeton Undergraduate Research Symposium

Princeton University (2012)

Outstanding Materials Student Award

Princeton University (2012)

Chisolm Prize for Best Inorganic Thesis

Princeton University (2012)

Energy Grand Challenges Fellowship

Princeton University (2011)

Publications

Publications are hyperlinked

‡Denotes co-first authorship

22. Wan, S.; Musielak, N.; Oliver, A. G.; Jaffe, A.* Controlling Electron Delocalization in Vanadium-Based Hybrid Bronzes through Molecular Templatation. *Angew. Chem., Int. Ed.* **2023**, e202314523.
21. Dayaratne, W. L.‡; Torres-Cadena, R.‡; Schmitt, B. P.; Westrick, E. M.; Jaffe, A.* Hybrid bronzes: mixed-valence organo-inorganic metal oxides as a tunable material platform. *Chem. Sci.* **2023**, *14*, 10756–10767.
20. Hartley, N. A.; Pugh, S. M.; Xu, Z.; Leong, D. C. Y.; Jaffe, A.; Forse, A. C. Quinone-functionalised carbons as new materials for electrochemical carbon dioxide capture. *J. Mater. Chem. A.* **2023**, *11*, 16221.

Prior to independent career

19. Wolf, N. R.; Jaffe, A.; Slavney, A. H.; Mao, W. L.; Leppert, L.; Karunadasa, H. I. Tuning defects in a halide double perovskite with pressure. *J. Am. Chem. Soc.* **2022**, *144*, 20763.
18. Jaramillo, D. E.; Jaffe, A.; Snyder, B. E. R.; Smith, A.; Taw, E.; Rohde, R.; Dods, M. N.; De Snoo, W.; Meihaus, K. R.; Harris, T. D.; Neaton, J. B.; Long, J. R. Metal–organic frameworks as O₂-selective adsorbents for air separations. *Chem. Sci.* **2022**, *13*, 10216.

17. Jaffe, A.‡; Zamkov, M.‡ Perovskites for Detection of Low- and High-Energy Radiation. *ACS Energy Lett.* **2022**, *7*, 366.
16. Jaffe, A.; Ziebel, M. E.; Halat, D. M.; Biggins, N.; Murphy, R. A.; Chakarawet, K.; Reimer, J. A.; Long, J. R. Selective, High-Temperature O₂ Adsorption in Chemically Reduced, Redox-Active Iron-Pyrazolate Metal–Organic Frameworks. *J. Am. Chem. Soc.* **2020**, *142*, 14627.
15. Lee, J.-H.; Jaffe, A.; Karunadasa, H. I.; Neaton, J. B. Origins of the Pressure-Induced Phase Transition and Metallization in the Halide Perovskite (CH₃NH₃)PbI₃. *ACS Energy Lett.* **2020**, *5*, 2174.
14. Jaffe, A.; Long, J. R. Ordered absences out of the blue. *Nature* **2020**, *578*, 222.
13. Jaffe, A.; Mack, S. A.; Lin, Y.; Mao, W. L.; Neaton, J. B.; Karunadasa, H. I. High Compression-Induced Conductivity in a Layered Cu–Br Hybrid Perovskite. *Angew. Chem., Int. Ed.*, **2020**, *59*, 4017.
12. Smith, M. D.; Crace, E. J.; Jaffe, A.; Karunadasa, H. I. The Diversity of Layered Halide Perovskites. *Annu. Rev. Mater. Res.* **2018**, *48*, 111.
11. Jaffe, A.; Lin, Y.; Karunadasa, H. I. Halide Perovskites under Pressure: Accessing New Properties through Lattice Compression. *ACS Energy Lett.*, **2017**, *2*, 1549.
10. Smith, M. D.‡; Jaffe, A.‡; Dohner, E. R.; Karunadasa, H. I. Structural Origins of Broadband Emission from Layered Pb–Br Hybrid Perovskites. *Chem. Sci.* **2017**, *8*, 4497.
9. George, N. C.; Brgoch, J.; Pell, A. J.; Cozzan, C.; Jaffe, A.; Dantelle, G.; Llobet, A.; Pintacuda, G.; Seshadri, R.; Chmelka, B. F. Correlating Local Compositions and Structures with the Macroscopic Optical Properties of Ce³⁺-doped CaSc₂O₄, an Efficient Green-Emitting Phosphor. *Chem. Mater.* **2017**, *29*, 3538.
8. Jaffe, A.; Lin, Y.; Mao, W. L.; Karunadasa, H. I. Pressure-Induced Metallization of the Halide Perovskite (CH₃NH₃)PbI₃. *J. Am. Chem. Soc.* **2017**, *139*, 4330.
7. Smith, I. C.; Smith, M. D.; Jaffe, A.; Lin, Y.; Karunadasa, H. I. Between the Sheets: Post-Synthetic Transformations in Hybrid Perovskites. *Chem. Mater.* **2017**, *29*, 1868.
6. Slavney, A. H.; Smaha, R. W.; Smith, I. C.; Jaffe, A.; Umeyama, D.; Karunadasa, H. I. Chemical Approaches to Addressing the Instability and Toxicity of Lead–Halide Perovskite Absorbers. *Inorg. Chem.* **2017**, *56*, 46.
5. Jaffe, A.; Lin, Y.; Beavers, C. M.; Voss, J.; Mao, W. L.; Karunadasa, H. I. High-Pressure Single-Crystal Structures of 3D Lead-Halide Hybrid Perovskites and Pressure Effects on their Electronic and Optical Properties. *ACS Cent. Sci.* **2016**, *2*, 201.
4. Jaffe, A.‡; Saldivar-Valdes, A.‡; Karunadasa, H. I. Quinone-Functionalized Carbon Black Cathodes for Lithium Batteries with High Power Densities. *Chem. Mater.* **2015**, *27*, 3568.
3. Jaffe, A.‡; Lin, Y.‡; Mao, W. L.; Karunadasa, H. I. Pressure-Induced Conductivity and Yellow-to-Black Piezochromism in a Layered Cu–Cl Hybrid Perovskite. *J. Am. Chem. Soc.* **2015**, *137*, 1673.
2. Dohner, E. R.; Jaffe, A.; Bradshaw, L. R.; Karunadasa, H. I. Intrinsic White-Light Emission from Layered Perovskites. *J. Am. Chem. Soc.* **2014**, *136*, 13154.
1. Jaffe, A.; Karunadasa, H. I. Lithium Cycling in a Self-Assembled Copper Chloride–Polyether Hybrid Electrode. *Inorg. Chem.* **2014**, *53*, 6494.

Leadership and Service

Teaching/Lecturing

Chemistry Across the Periodic Table – General Chemistry (Professor)	University of Notre Dame (2023 –)
Solid-State and Materials Chemistry (Professor)	University of Notre Dame (2021 –)
Advanced Inorganic Chemistry (Guest Lecturer)	Stanford University (2013)
Structure and Reactivity – Organic Chemistry (Teaching Assistant)	Stanford University (2013)
Chemical Principles II – General Chemistry (Teaching Assistant)	Stanford University (2013)
Organic Chemistry Lab I (Teaching Assistant)	Stanford University (2012)

Outreach

Lab Hacks instructional YouTube Channel	(2023 –)
ND Talent Search	University of Notre Dame (2022 –)
Science Alive! South Bend	University of Notre Dame (2021 –)
Bay Area Scientists in Schools (BASIS)	UC Berkeley (2017 – 2020)
Clubes de Ciencia, Guanajuato, México	(2017 – 2018)
Clubes de Ciencia, Mini Massive Open Online Courses, México City	(2016 – 2017)

Mentorship

Current and former Notre Dame mentees: 7 graduate students, 8 undergraduates, 3 visiting researchers	University of Notre Dame (2021 –)
Postdoctoral mentor to two graduate students	UC Berkeley (2017 – 2021)
Graduate mentor to three graduate students and one undergraduate student	Stanford University (2012 – 2017)

Service

Materials Science and Engineering Academic Committee
Graduate Admissions Committee

University of Notre Dame (2022 –)
University of Notre Dame (2020 –)

Presentations

Invited Talks and Conference Seminars

North American Solid-State Chemistry Conference, Calgary, Canada (August 2023)
ND Energy Research Symposium (May 2023)
265th ACS National Meeting, Indianapolis, IN (March 2023)
AVS Prairie Chapter Fall Symposium (September 2022)
ACS Inorganic Chemistry Lectureship Award Symposium, Chicago, IL (August 2022)
nanoGE, fundació Scito (July 2022)
ND Energy Faculty Luncheon, Notre Dame IN (May 2022)
NDnano Network Lunch, Notre Dame, IN (September 2021)
260th ACS National Meeting, San Francisco, CA (August 2020)
256th ACS National Meeting, Boston, MA (August 2018)
Universidad Nacional Autónoma de México (UNAM), México City, México (August 2017)
253rd ACS National Meeting, San Francisco, CA (April 2017)
IBM, Almaden, CA (September 2016)
Solid State Chemistry Gordon Research Seminar, New London, NH (July 2016)
Inorganic Chemistry Gordon Research Seminar, Biddeford, ME (June 2016)

Posters

Solid State Chemistry Gordon Research Conference, New London, NH (July 2020)
North American Solid-State Chemistry Conference, Santa Barbara, CA (August 2017)
Solid State Chemistry Gordon Research Conference, New London, NH (July 2016)
Inorganic Chemistry Gordon Research Conference, Biddeford, ME (June 2016)
Mathematical and Physical Sciences (MPS) NSF Symposium, Stanford, CA (February 2015)
Crystal Engineering Gordon Research Conference, Waterville Valley, NH (June 2014)