



## Matteo Cargnello

Associate Professor of Chemical Engineering, Senior Fellow at the Precourt Institute for Energy and Associate Professor, by courtesy, of Materials Science and Engineering

 Curriculum Vitae available Online

### CONTACT INFORMATION

- **Administrative Contact**

Chi-Wen Chien

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### Bio

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#### BIO

Matteo Cargnello received his Ph.D. in Nanotechnology in 2012 at the University of Trieste, Italy, under the supervision of Prof. Paolo Fornasiero, and he was then a post-doctoral scholar in the Chemistry Department at the University of Pennsylvania with Prof. Christopher B. Murray before joining the Faculty at Stanford University in January 2015. He is currently Associate Professor of Chemical Engineering and, by courtesy, of Materials Science and Engineering and Silas Palmer Faculty Scholar. Dr. Cargnello is the recipient of several awards including the Sloan Fellowship in 2018, the Mitsui Chemicals Catalysis Science Award for Creative Work in 2020, and the Early Career Award in Catalysis from the ACS Catalysis Division in 2022. The general goals of the research in the Cargnello group pertain to solving energy and environmental challenges. The group focuses on capture and conversion of carbon dioxide, emission control and reduction of methane and hydrocarbon emissions in the atmosphere, sustainable chemical practices through electro- and photocatalysis, sustainable production of hydrogen, and chemical recycling of plastics.

#### ACADEMIC APPOINTMENTS

- Associate Professor, Chemical Engineering
- Senior Fellow, Precourt Institute for Energy
- Associate Professor (By courtesy), Materials Science and Engineering
- Member, Bio-X

#### HONORS AND AWARDS

- Silas Palmer Faculty Scholar, Stanford University (2023-2026)
- Vance D. and Arlene C. Coffman Faculty Scholar, Stanford University (2023)
- Early Career Award in Catalysis, ACS Catalysis Division (2022)
- Leonardo Award in Engineering/Math, Leonardo Da Vinci Society (2021)
- Catalysis Science Award for Creative Work, Mitsui Chemicals (2020)
- Mid-Career Nanotechnology Scientific Award, ANNIC (2019)
- Sloan Research Fellowship, Alfred P. Sloan Foundation (2018)
- Outstanding Poster Award, Catalysis Gordon Research Conference (2018)

- Hellman Fellow, Hellman Fellows Fund (2018)
- Junior award, European Rare Earth and Actinide Society (ERES) (2018)
- Young Scientist Prize, 16th International Congress on Catalysis, Beijing (China) (2016)
- Terman Faculty Fellow, Stanford University (2015)
- Best European PhD Thesis in Catalysis, European Federation of Catalysis Societies (EFCATS) (2013)
- ENI Award "Debut in Research", ENI (2013)
- Levi Award, Italian Chemical Society (SCI) (2012)
- Inorganic Chemistry Division Award, Italian Chemical Society (SCI) (2012)

## PROFESSIONAL EDUCATION

- PhD, University of Trieste , Nanotechnology (2012)

## LINKS

- Cargnello Group Website: <http://cargnellogroup.stanford.edu/>

## Teaching

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### COURSES

#### 2025-26

- Microkinetics - Molecular Principles of Chemical Kinetics: CHEMENG 130A (Spr)
- Principles and practice of heterogeneous catalysis: CHEMENG 443 (Win)

#### 2024-25

- Graduate Practical Training: CHEMENG 299 (Sum)
- Microkinetics - Molecular Principles of Chemical Kinetics: CHEMENG 130A (Spr)
- Principles and practice of heterogeneous catalysis: CHEMENG 443 (Win)
- When Chemistry Meets Engineering: CHEMENG 31N (Aut)

#### 2023-24

- Microkinetics - Molecular Principles of Chemical Kinetics: CHEMENG 130A (Spr)
- Principles and practice of heterogeneous catalysis: CHEMENG 443 (Win)

#### 2022-23

- Microkinetics - Molecular Principles of Chemical Kinetics: CHEMENG 130A (Spr)
- Principles and practice of heterogeneous catalysis: CHEMENG 443 (Aut)
- Special Topics in Nanostructured Materials for Energy and the Environment: CHEMENG 521 (Aut)
- When Chemistry Meets Engineering: CHEMENG 31N (Win)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Colin Crago, Nadine Humphrey, Jesse Matthews, Zhennan Ru, Keshu Tamakuwala, Katherine Yan, Sihe Zhang

#### Postdoctoral Faculty Sponsor

Wooje Cho, Jake Heinlein, Kang Rui Garrick Lim, Tian Ren, Zhenwei Wu, Ning Yu

#### Doctoral Dissertation Advisor (AC)

Juan Aguilar Lopez, Devashish Bhave, Pin-Hung Chung, Andy Fong, Alex Fontani Herreros, Daniel Hutton, Samantha Le, Henry Moise, Sydney Richardson, Shradha Sapru, Sai Varanasi

#### Doctoral Dissertation Co-Advisor (AC)

Jenna Ahn, Genni Liccardo, Maddie Swint, Alexis Voulgaropoulos

## Publications

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### PUBLICATIONS

- **A Perspective on Supported Catalysts for Methane Pyrolysis: Toward Hydrogen Production and Synthesis of Crystalline Carbon Materials** *ACS CATALYSIS*  
Le, S., Moise, H., Cargnello, M.  
2026
- **Competitive reactivity drives size- and composition-focusing in multimetallic nanocrystals.** *Science (New York, N.Y.)*  
Yoon, J., Oh, J., Kim, D., Chung, P. H., Hong, N., Heinlein, J., Lizandara-Pueyo, C., Sánchez-Carrera, R. S., Park, J., Jung, H. T., Cargnello, M.  
2026; 392 (6798): eaea8044
- **The ever-evolving active site: transformation of single atoms to extended structures during the Rh-catalyzed reverse water-gas shift reaction.** *Faraday discussions*  
Barber, G., Chen, X., Khan, A., Heinlein, J., Gericke, S. M., Li, M., Zakharov, D., Yang, J., Head, A. R., Cargnello, M., Rioux, R. M., Bare, S. R.  
2026
- **Seed-Mediated Colloidal Synthesis of Multimetallic and High-Entropy Alloy Nanocrystal Libraries with Enhanced Catalytic Performance.** *Journal of the American Chemical Society*  
Oh, J., Han, S., Gardner, E. J., Parekh, R., Dannar, A., Chung, P. H., Zheng, K., Mian, A., Bustillo, K. C., Reece, C., Frenkel, A. I., Ophus, C., Lizandara-Pueyo, et al  
2026
- **Effect of Oxide Chemistry on Pt Redistribution and Site Exposure in ALD-Coated Catalysts** *ACS CATALYSIS*  
Nhan, B. T., Mandal, S. C., Smith, J., Liccardo, G., Richardson, S., Abild-Pedersen, F., Chi, M., Cargnello, M., Bent, S. F.  
2026
- **Eliciting a Synergistic Effect between Mixed Metal Oxides and Metallic Pt Nanoparticles for Active and Stable Catalysts** *ACS CATALYSIS*  
Richardson, S., Smith, J., Oh, J., Nhan, B. T., Chi, M., Cargnello, M.  
2026
- **Well-defined nanoparticles: synthesis, characterization, applications in the XXI century (Surface Science special issue)** *SURFACE SCIENCE*  
Cargnello, M., Zhang, S.  
2025; 761
- **Prospects of Nanoscience with Nanocrystals: 2025 Edition.** *ACS nano*  
Ibáñez, M., Boehme, S. C., Buonsanti, R., De Roo, J., Milliron, D. J., Ithurria, S., Rogach, A. L., Cabot, A., Yarema, M., Cossairt, B. M., Reiss, P., Talapin, D. V., Protesescu, et al  
2025
- **Oxidant-assisted methane pyrolysis.** *Chemical science*  
Gigantino, M., Moise, H., Haribal, V., Tong, A., Shen, J. P., Saad, D., Fishman, J., Nelson, A., Voorhis, H., Sun, E., Brandt, A., Gupta, R., Majumdar, et al  
2025
- **How co-products enable clean hydrogen** *NATURE SUSTAINABILITY*  
Moise, H., Cargnello, M.  
2025
- **Temperature-dependent solid electrolyte interphase reactions drive performance in lithium-mediated nitrogen reduction to ammonia** *JOULE*  
Benedek, P., Cornejo-Carrillo, Y. E., O'Rafferty, A. H., Niemann, V. A., Lee, S., Mcshane, E. J., Cargnello, M., Niel, A. C., Jaramillo, T. F.

2025; 9 (3)

- **Cold plasma activated CO<sub>2</sub> desorption from calcium carbonate for carbon capture** *RSC SUSTAINABILITY*  
Zhong, H., Piriaei, D., Liccardo, G., Kang, J., Wang, B., Cargnello, M., Cappelli, M. A.  
2025
- **Long-Range Metal-Sorbent Interactions Determine CO<sub>2</sub> Capture and Conversion in Dual-Function Materials.** *ACS nano*  
Sapru, S., Hart, K. D., Zhou, C., Liccardo, G., Oh, J., Hollobaugh, M. J., Osio-Norgaard, J., Majumdar, A., Chandler, B. D., Cargnello, M.  
2025
- **Dream reactions of CO<sub>2</sub> capture, conversion, and beyond** *CELL REPORTS PHYSICAL SCIENCE*  
Angenent, L., Bunzel, H., Cargnello, M., Furst, A., Garcia, S., Kopke, M., Lassen, K., Milton, R. D., Sousa, D. Z.  
2024; 5 (12)
- **Aqueous-Phase Synthesis of Pt and PGM-Based Nanocrystals with a Controllable Size** *CRYSTAL GROWTH & DESIGN*  
Chung, P., Yang, A., Zhou, C., Oh, J., Homer, M., Lizandara-Pueyo, C., Li, Y., Cargnello, M.  
2024
- **A General Approach for Metal Nanoparticle Encapsulation Within Porous Oxides.** *Advanced materials (Deerfield Beach, Fla.)*  
Zhou, C., Oh, J., Stone, M. L., Richardson, S., Chung, P. H., Osio-Norgaard, J., Nhan, B. T., Kumar, A., Chi, M., Cargnello, M.  
2024: e2409710
- **Dynamic Behavior of Pt Multimetallic Alloys for Active and Stable Propane Dehydrogenation Catalysts.** *Journal of the American Chemical Society*  
Werghi, B., Saini, S., Chung, P. H., Kumar, A., Ebrahim, A. M., Abels, K., Chi, M., Abild-Pedersen, F., Bare, S. R., Cargnello, M.  
2024
- **A Career in Catalysis: Raymond J. Gorte** *ACS CATALYSIS*  
Abdelrahman, O. A., Altman, E. I., Cargnello, M., Fornasiero, P., Kim, G., Kungas, R., Luo, J., McIntosh, S., Oh, T., Onn, T., Vohs, J. M.  
2024
- **Unveiling the Stability of Encapsulated Pt Catalysts Using Nanocrystals and Atomic Layer Deposition.** *Journal of the American Chemical Society*  
Liccardo, G., Cendejas, M. C., Mandal, S. C., Stone, M. L., Porter, S., Nhan, B. T., Kumar, A., Smith, J., Plessow, P. N., Cegelski, L., Osio-Norgaard, J., Abild-Pedersen, F., Chi, et al  
2024
- **Steam-Assisted Selective CO<sub>2</sub> Hydrogenation to Ethanol over Ru-In Catalysts.** *Angewandte Chemie (International ed. in English)*  
Zhou, C., Aitbekova, A., Liccardo, G., Oh, J., Stone, M., McShane, E. J., Werghi, B., Nathan, S., Song, C., Ciston, J., Bustillo, K., Hoffman, A. S., Hong, et al  
2024: e202406761
- **Understanding and Harnessing Nanoscale Immiscibility in Ru-In Alloys for Selective CO<sub>2</sub> Hydrogenation.** *Journal of the American Chemical Society*  
Zhou, C., Liccardo, G., Hoffman, A. S., Oh, J., Holmes, S. E., Vaillonis, A., Bare, S. R., Cargnello, M.  
2024
- **Engineering Ultrathin Alloy Shell in Au@AuPd Core-Shell Nanoparticles for Efficient Plasmon-Driven Photocatalysis** *ADVANCED MATERIALS INTERFACES*  
Kang, E., Seo, J., Park, H., Wrasman, C. J., Shin, J., Jo, M., Cargnello, M., Park, J., Lee, H.  
2024
- **Palladium Catalysts for Methane Oxidation: Old Materials, New Challenges.** *Accounts of chemical research*  
Oh, J., Boucly, A., van Bokhoven, J. A., Artiglia, L., Cargnello, M.  
2023
- **Technoeconomics and carbon footprint of hydrogen production** *INTERNATIONAL JOURNAL OF HYDROGEN ENERGY*  
Rojas, J., Zhai, S., Sun, E., Haribal, V., Marin-Quiros, S., Sarkar, A., Gupta, R., Cargnello, M., Chueh, W., Majumdar, A.  
2024; 49: 59-74
- **Understanding the effects of manganese and zinc promoters on ferrite catalysts for CO<sub>2</sub> hydrogenation to hydrocarbons through colloidal nanocrystals** *SURFACE SCIENCE*

- Chen, C., Oh, J., Yang, A., Zhou, C., Liccardo, G., Sapru, S., Cargnello, M.  
2024; 741
- **Ceria Incorporation in Sinter-Resistant Platinum-Based Catalysts** *ACS CATALYSIS*  
Stone, M. L., Cendejas, M. C., Persson, A., Liccardo, G., Smith, J., Kumar, A., Zhou, C., Gardner, E., Aitbekova, A., Bustillo, K. C., Chi, M., Bare, S. R., Cargnello, et al  
2023; 13 (22): 14853-14863
  - **Quantifying Influence of the Solid-Electrolyte Interphase in Ammonia Electrosynthesis** *ACS ENERGY LETTERS*  
Mcshane, E. J., Niemann, V. A., Benedek, P., Fu, X., Nielander, A. C., Chorkendorff, I., Jaramillo, T. F., Cargnello, M.  
2023
  - **Activity of Silica-Alumina for the Conversion of Polyethylene into Tunable Aromatics Below Pyrolytic Temperatures** *ACS SUSTAINABLE CHEMISTRY & ENGINEERING*  
Pennel, M. L., Maurya, A. K., Ebrahim, A. M., Tassone, C. J., Cargnello, M.  
2023
  - **A semi-continuous process for co-production of CO<sub>2</sub>-free hydrogen and carbon nanotubes via methane pyrolysis** *CELL REPORTS PHYSICAL SCIENCE*  
Sun, E., Zhai, S., Kim, D., Gigantino, M., Haribal, V., Dewey, O. S., Williams, S. M., Wan, G., Nelson, A., Marin-Quiros, S., Martis, J., Zhou, C., Oh, et al  
2023; 4 (4)
  - **Selective Catalytic Behavior Induced by Crystal-Phase Transformation in Well-Defined Bimetallic Pt-Sn Nanocrystals.** *Small (Weinheim an der Bergstrasse, Germany)*  
Werghi, B., Wu, L., Ebrahim, A. M., Chi, M., Ni, H., Cargnello, M., Bare, S. R.  
2023: e2207956
  - **Studying, Promoting, Exploiting, and Predicting Catalyst Dynamics: the Next Frontier in Heterogeneous Catalysis** *JOURNAL OF PHYSICAL CHEMISTRY C*  
Chavez, S., Werghi, B., Gutierrez, K., Chen, R., Lall, S., Cargnello, M.  
2023
  - **Studying, Promoting, Exploiting, and Predicting Catalyst Dynamics: the Next Frontier in Heterogeneous Catalysis** *JOURNAL OF PHYSICAL CHEMISTRY C*  
Chavez, S., Werghi, B., Gutierrez, K., Chen, R., Lall, S., Cargnello, M.  
2023
  - **Colloidally Engineered Pd and Pt Catalysts Distinguish Surface- and Vapor-Mediated Deactivation Mechanisms** *ACS CATALYSIS*  
Oh, J., Beck, A., Goodman, E. D., Roling, L. T., Boucly, A., Artiglia, L., Abild-Pedersen, F., van Bokhoven, J. A., Cargnello, M.  
2023
  - **The mosaic art of interphases** *NATURE ENERGY*  
McShane, E. J., Cargnello, M.  
2023
  - **A Versatile Li<sub>0.5</sub>FePO<sub>4</sub> Reference Electrode for Nonaqueous Electrochemical Conversion Technologies** *ACS ENERGY LETTERS*  
McShane, E. J., Benedek, P., Niemann, V. A., Blair, S. J., Kamat, G. A., Nielander, A. C., Jaramillo, T. F., Cargnello, M.  
2022: 230-235
  - **Templated encapsulation of platinum-based catalysts promotes high-temperature stability to 1,100°C.** *Nature materials*  
Aitbekova, A., Zhou, C., Stone, M. L., Lezama-Pacheco, J. S., Yang, A., Hoffman, A. S., Goodman, E. D., Huber, P., Stebbins, J. F., Bustillo, K. C., Ercius, P., Ciston, J., Bare, et al  
2022
  - **Recycling of Solvent Allows for Multiple Rounds of Reproducible Nanoparticle Synthesis.** *Journal of the American Chemical Society*  
Wrasmann, C. J., Zhou, C., Aitbekova, A., Goodman, E. D., Cargnello, M.  
2022
  - **Steering CO<sub>2</sub> hydrogenation toward C-C coupling to hydrocarbons using porous organic polymer/metal interfaces.** *Proceedings of the National Academy of Sciences of the United States of America*

- Zhou, C., Asundi, A. S., Goodman, E. D., Hong, J., Werghi, B., Hoffman, A. S., Nathan, S. S., Bent, S. F., Bare, S. R., Cargnello, M.  
2022; 119 (7)
- **Colloidal Platinum-Copper Nanocrystal Alloy Catalysts Surpass Platinum in Low-Temperature Propene Combustion.** *Journal of the American Chemical Society*  
Tahsini, N., Yang, A. C., Streibel, V., Werghi, B., Goodman, E. D., Aitbekova, A., Bare, S. R., Li, Y., Abild-Pedersen, F., Cargnello, M.  
2022
  - **Voltage cycling process for the electroconversion of biomass-derived polyols.** *Proceedings of the National Academy of Sciences of the United States of America*  
Kim, D., Zhou, C., Zhang, M., Cargnello, M.  
2021; 118 (41)
  - **Monolayer Support Control and Precise Colloidal Nanocrystals Demonstrate Metal-Support Interactions in Heterogeneous Catalysts.** *Advanced materials (Deerfield Beach, Fla.)*  
Goodman, E. D., Asundi, A. S., Hoffman, A. S., Bustillo, K. C., Stebbins, J. F., Bare, S. R., Bent, S. F., Cargnello, M.  
2021: e2104533
  - **Insights and comparison of structure-property relationships in propane and propene catalytic combustion on Pd- and Pt-based catalysts** *JOURNAL OF CATALYSIS*  
Yang, A., Streibel, V., Choksi, T. S., Aljama, H., Werghi, B., Bare, S. R., Sanchez-Carrera, R. S., Schaefer, A., Li, Y., Abild-Pedersen, F., Cargnello, M.  
2021; 401: 89-101
  - **Support Acidity Improves Pt Activity in Propane Combustion in the Presence of Steam by Reducing Water Coverage on the Active Sites** *ACS CATALYSIS*  
Yang, A., Zhu, H., Li, Y., Cargnello, M.  
2021; 11 (11): 6672-6683
  - **A General Approach for Monolayer Adsorption of High Weight Loadings of Uniform Nanocrystals on Oxide Supports.** *Angewandte Chemie (International ed. in English)*  
Kao, K., Yang, A., Huang, W., Zhou, C., Goodman, E. D., Holm, A., Frank, C. W., Cargnello, M.  
2021
  - **Steam-created grain boundaries for methane C-H activation in palladium catalysts.** *Science (New York, N.Y.)*  
Huang, W., Johnston-Peck, A. C., Wolter, T., Yang, W. D., Xu, L., Oh, J., Reeves, B. A., Zhou, C., Holtz, M. E., Herzing, A. A., Lindenberg, A. M., Mavrikakis, M., Cargnello, et al  
2021; 373 (6562): 1518-1523
  - **Atmospheric Methane Removal: A Research Agenda** *Philosophical Transactions of the Royal Society A*  
Jackson, R. B., et al  
2021; 379: 20200454
  - **Size-controlled nanocrystals reveal spatial dependence and severity of nanoparticle coalescence and Ostwald ripening in sintering phenomena.** *Nanoscale*  
Goodman, E. D., Carlson, E. Z., Dietze, E. M., Tahsini, N., Johnson, A., Aitbekova, A., Nguyen Taylor, T., Plessow, P. N., Cargnello, M.  
2020
  - **A phytophotonic approach to enhanced photosynthesis** *ENERGY & ENVIRONMENTAL SCIENCE*  
Kunz, L. Y., Redekop, P., Ort, D. R., Grossman, A. R., Cargnello, M., Majumdar, A.  
2020; 13 (12): 4794-4807
  - **Nanoscale Spatial Distribution of Supported Nanoparticles Controls Activity and Stability in Powder Catalysts for CO Oxidation and Photocatalytic H<sub>2</sub> Evolution.** *Journal of the American Chemical Society*  
Holm, A., Goodman, E. D., Stenlid, J. H., Aitbekova, A., Zelaya, R., Diroll, B. T., Johnston-Peck, A. C., Kao, K. C., Frank, C. W., Pettersson, L. G., Cargnello, M.  
2020; 142 (34): 14481-14494
  - **Dynamics of Copper-Containing Porous Organic Framework Catalysts Reveal Catalytic Behavior Controlled by the Polymer Structure** *ACS CATALYSIS*  
Wu, Z., Zhang, X., Goodman, E. D., Huang, W., Riscoe, A. R., Yacob, S., Cargnello, M.  
2020; 10 (16): 9356-65

- **Enhanced Catalytic Activity for Methane Combustion through in Situ Water Sorption** *ACS CATALYSIS*  
Huang, W., Zhang, X., Yang, A., Goodman, E. D., Kao, K., Cargnello, M.  
2020; 10 (15): 8157–67
- **Chemically Controllable Porous Polymer-Nanocrystal Composites with Hierarchical Arrangement Show Substrate Transport Selectivity** *CHEMISTRY OF MATERIALS*  
Riscoe, A. R., Wrasman, C. J., Menon, A., Dinakar, B., Goodman, E. D., Kunz, L. Y., Yacob, S., Cargnello, M.  
2020; 32 (13): 5904–15
- **Formic acid oxidation boosted by Rh single atoms.** *Nature nanotechnology*  
Kim, D., Cargnello, M.  
2020
- **Dilute Pd/Au Alloys Replace Au/TiO<sub>2</sub> Interface for Selective Oxidation Reactions** *ACS CATALYSIS*  
Wrasman, C. J., Riscoe, A. R., Lee, H., Cargnello, M.  
2020; 10 (3): 1716–20
- **A Combined Theory-Experiment Analysis of the Surface Species in Lithium-Mediated NH<sub>3</sub> Electrosynthesis** *CHEMELECTROCHEM*  
Schwalbe, J. A., Statt, M. J., Chosy, C., Singh, A. R., Rohr, B. A., Nielander, A. C., Andersen, S. Z., McEnaney, J. M., Baker, J. G., Jaramillo, T. F., Norskov, J. K., Cargnello, M.  
2020
- **Design of Organic/Inorganic Hybrid Catalysts for Energy and Environmental Applications.** *ACS central science*  
Goodman, E. D., Zhou, C. n., Cargnello, M. n.  
2020; 6 (11): 1916–37
- **Revealing the structure of a catalytic combustion active-site ensemble combining uniform nanocrystal catalysts and theory insights.** *Proceedings of the National Academy of Sciences of the United States of America*  
Yang, A. C., Choksi, T. n., Streibel, V. n., Aljama, H. n., Wrasman, C. J., Roling, L. T., Goodman, E. D., Thomas, D. n., Bare, S. R., Sánchez-Carrera, R. S., Schäfer, A. n., Li, Y. n., Abild-Pedersen, et al  
2020
- **Transition state and product diffusion control by polymer-nanocrystal hybrid catalysts** *NATURE CATALYSIS*  
Riscoe, A. R., Wrasman, C. J., Herzing, A. A., Hoffman, A. S., Menon, A., Boubnov, A., Vargas, M., Bare, S. R., Cargnello, M.  
2019; 2 (10): 852–63
- **Engineering of Ruthenium-Iron Oxide Colloidal Heterostructures Leads to Improved Yields in CO<sub>2</sub> Hydrogenation to Hydrocarbons.** *Angewandte Chemie (International ed. in English)*  
Cargnello, M., Aitbekova, A., Goodman, E., Wu, L., Boubnov, A., Hoffman, A., Genc, A., Cheng, H., Casalena, L., Bare, S.  
2019
- **Catalyst deactivation via decomposition into single atoms and the role of metal loading** *NATURE CATALYSIS*  
Goodman, E. D., Johnston-Peck, A. C., Dietze, E. M., Wrasman, C. J., Hoffman, A. S., Abild-Pedersen, F., Bare, S. R., Plessow, P. N., Cargnello, M.  
2019; 2 (9): 748–55
- **A Versatile Method for Ammonia Detection in a Range of Relevant Electrolytes via Direct Nuclear Magnetic Resonance Techniques** *ACS CATALYSIS*  
Nielander, A. C., McEnaney, J. M., Schwalbe, J. A., Baker, J. G., Blair, S. J., Wang, L., Pelton, J. G., Andersen, S. Z., Enemark-Rasmussen, K., Colic, V., Yang, S., Bent, S. F., Cargnello, et al  
2019; 9 (7): 5797–5802
- **A rigorous electrochemical ammonia synthesis protocol with quantitative isotope measurements.** *Nature*  
Andersen, S. Z., Colic, V., Yang, S., Schwalbe, J. A., Nielander, A. C., McEnaney, J. M., Enemark-Rasmussen, K., Baker, J. G., Singh, A. R., Rohr, B. A., Statt, M. J., Blair, S. J., Mezzavilla, et al  
2019
- **Artificial inflation of apparent photocatalytic activity induced by catalyst-mass-normalization and a method to fairly compare heterojunction systems** *ENERGY & ENVIRONMENTAL SCIENCE*  
Kunz, L. Y., Diroll, B. T., Wrasman, C. J., Riscoe, A. R., Majumdar, A., Cargnello, M.  
2019; 12 (5): 1657–67

- **Colloidal Nanocrystals as Building Blocks for Well-Defined Heterogeneous Catalysts** *CHEMISTRY OF MATERIALS*  
Cargnello, M.  
2019; 31 (3): 576–96
- **Colloidal nanocrystals for heterogeneous catalysis** *NANO TODAY*  
Losch, P., Huang, W., Goodman, E. D., Wrasman, C. J., Holm, A., Riscoe, A. R., Schwalbe, J. A., Cargnello, M.  
2019; 24: 15–47
- **Supported Catalyst Deactivation by Decomposition into Single Atoms Is Suppressed by Increasing Metal Loading.** *Nature catalysis*  
Goodman, E. D., Johnston-Peck, A. C., Dietze, E. M., Wrasman, C. J., Hoffman, A. S., Abild-Pedersen, F., Bare, S. R., Plessow, P. N., Cargnello, M.  
2019; 2
- **Synthesis of Colloidal Pd/Au Dilute Alloy Nanocrystals and Their Potential for Selective Catalytic Oxidations.** *Journal of the American Chemical Society*  
Wrasman, C. J., Boubnov, A., Riscoe, A. R., Hoffman, A. S., Bare, S. R., Cargnello, M.  
2018
- **Deconvoluting Transient Water Effects on the Activity of Pd Methane Combustion Catalysts** *INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH*  
Huang, W., Goodman, E. D., Losch, P., Cargnello, M.  
2018; 57 (31): 10261–68
- **In Situ X-ray Scattering Guides the Synthesis of Uniform PtSn Nanocrystals.** *Nano letters*  
Wu, L., Fournier, A. P., Willis, J. J., Cargnello, M., Tassone, C. J.  
2018
- **Low-Temperature Restructuring of CeO<sub>2</sub>-Supported Ru Nanoparticles Determines Selectivity in CO<sub>2</sub> Catalytic Reduction.** *Journal of the American Chemical Society*  
Aitbekova, A. n., Wu, L. n., Wrasman, C. J., Boubnov, A. n., Hoffman, A. S., Goodman, E. D., Bare, S. R., Cargnello, M. n.  
2018; 140 (42): 13736–45
- **Systematic Identification of Promoters for Methane Oxidation Catalysts Using Size- and Composition-Controlled Pd-Based Bimetallic Nanocrystals.** *Journal of the American Chemical Society*  
Willis, J. J., Goodman, E. D., Wu, L., Riscoe, A. R., Martins, P., Tassone, C. J., Cargnello, M.  
2017; 139 (34): 11989-11997
- **High-temperature crystallization of nanocrystals into three-dimensional superlattices** *NATURE*  
Wu, L., Willis, J. J., McKay, I., Diroll, B. T., Qin, J., Cargnello, M., Tassone, C. J.  
2017; 548 (7666): 197+
- **Elucidating the synergistic mechanism of nickel-molybdenum electrocatalysts for the hydrogen evolution reaction** *MRS COMMUNICATIONS*  
Mckay, I. S., Schwalbe, J. A., Goodman, E. D., Willis, J. J., Majumdar, A., Cargnello, M.  
2016; 6 (3): 241-246
- **Polycatenar Ligand Control of the Synthesis and Self-Assembly of Colloidal Nanocrystals** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Diroll, B. T., Jishkariani, D., Cargnello, M., Murray, C. B., Donnio, B.  
2016; 138 (33): 10508-10515
- **Revealing particle growth mechanisms by combining high-surface-area catalysts made with monodisperse particles and electron microscopy conducted at atmospheric pressure** *JOURNAL OF CATALYSIS*  
Zhang, S., Cargnello, M., Cai, W., Murray, C. B., Graham, G. W., Pan, X.  
2016; 337: 240-247
- **Engineering titania nanostructure to tune and improve its photocatalytic activity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Cargnello, M., Montini, T., Smolin, S. Y., Priebe, J. B., Jaen, J. J., Doan-Nguyen, V. V., McKay, I. S., Schwalbe, J. A., Pohl, M., Gordon, T. R., Lu, Y., Baxter, J. B., Brueckner, et al  
2016; 113 (15): 3966-3971

- **Substitutional doping in nanocrystal superlattices** *NATURE*  
Cargnello, M., Johnston-Peck, A. C., Diroll, B. T., Wong, E., Datta, B., Damodhar, D., Doan-Nguyen, V. V., Herzing, A. A., Kagan, C. R., Murray, C. B.  
2015; 524 (7566): 450-?
- **Substitutional doping in nanocrystal superlattices.** *Nature*  
Cargnello, M., Johnston-Peck, A. C., Diroll, B. T., Wong, E., Datta, B., Damodhar, D., Doan-Nguyen, V. V., Herzing, A. A., Kagan, C. R., Murray, C. B.  
2015; 524 (7566): 450-3
- **Efficient Removal of Organic Ligands from Supported Nanocrystals by Fast Thermal Annealing Enables Catalytic Studies on Well-Defined Active Phases** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Cargnello, M., Chen, C., Diroll, B. T., Doan-Nguyen, V. V., Gorte, R. J., Murray, C. B.  
2015; 137 (21): 6906-6911
- **Dynamic structural evolution of supported palladium-ceria core-shell catalysts revealed by in situ electron microscopy.** *Nature communications*  
Zhang, S., Chen, C., Cargnello, M., Fornasiero, P., Gorte, R. J., Graham, G. W., Pan, X.  
2015; 6: 7778-?
- **Solution-Phase Synthesis of Titanium Dioxide Nanoparticles and Nanocrystals** *CHEMICAL REVIEWS*  
Cargnello, M., Gordon, T. R., Murray, C. B.  
2014; 114 (19): 9319-9345
- **Enhanced Energy Transfer in Quasi-Quaternary Nanocrystal Superlattices** *ADVANCED MATERIALS*  
Cargnello, M., Diroll, B. T., Gauding, E. A., Murray, C. B.  
2014; 26 (15): 2419-2423
- **Control of Metal Nanocrystal Size Reveals Metal-Support Interface Role for Ceria Catalysts** *SCIENCE*  
Cargnello, M., Doan-Nguyen, V. V., Gordon, T. R., Diaz, R. E., Stach, E. A., Gorte, R. J., Fornasiero, P., Murray, C. B.  
2013; 341 (6147): 771-773
- **Exceptional Activity for Methane Combustion over Modular Pd@CeO<sub>2</sub> Subunits on Functionalized Al<sub>2</sub>O<sub>3</sub>** *SCIENCE*  
Cargnello, M., Delgado Jaen, J. J., Hernandez Garrido, J. C., Bakhmutsky, K., Montini, T., Calvino Gamez, J. J., Gorte, R. J., Fornasiero, P.  
2012; 337 (6095): 713-717
- **Multiwalled Carbon Nanotubes Drive the Activity of Metal@oxide Core-Shell Catalysts in Modular Nanocomposites** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Cargnello, M., Grzelczak, M., Rodriguez-Gonzalez, B., Syrgiannis, Z., Bakhmutsky, K., La Parola, V., Liz-Marzan, L. M., Gorte, R. J., Prato, M., Fornasiero, P.  
2012; 134 (28): 11760-11766
- **Nonaqueous Synthesis of TiO<sub>2</sub> Nanocrystals Using TiF<sub>4</sub> to Engineer Morphology, Oxygen Vacancy Concentration, and Photocatalytic Activity** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Gordon, T. R., Cargnello, M., Paik, T., Mangolini, F., Weber, R. T., Fornasiero, P., Murray, C. B.  
2012; 134 (15): 6751-6761
- **Synthesis of Dispersible Pd@CeO<sub>2</sub> Core-Shell Nanostructures by Self-Assembly** *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*  
Cargnello, M., Wieder, N. L., Montini, T., Gorte, R. J., Fornasiero, P.  
2010; 132 (4): 1402-1409