

Edward Hartley Sargent

Academic History

Name: Edward Hartley Sargent

Degrees:
Queen's University
B.Sc. Engineering
Engineering Physics, Electrical Option
Degree obtained June 1995

University of Toronto
Ph.D.
Department of Electrical and Computer Engineering
Degree obtained November 1998
Thesis title:
“The Lateral Current Injection Laser: Theory, Design, Fabrication”
Supervisor: Prof. J. M. Xu

Appointments:
Assistant Professor
Department of Electrical and Computer Engineering
University of Toronto
July 1 1998 – June 30 2001

Assistant Professor
Canada Research Chair in Emerging Technologies
Edward S. Rogers Sr. Department of Electrical and Computer
Engineering
University of Toronto
July 1 2001 – June 30 2002

Associate Professor
Canada Research Chair in Emerging Technologies
Edward S. Rogers Sr. Department of Electrical and Computer
Engineering
University of Toronto
July 1 2002 – September 2005

Visiting Professor
Micromechanics Center
Nanotechnology and Photonics
Massachusetts Institute of Technology
July 1 2004 – June 30 2005

Full Professor
Canada Research Chair in Nanotechnology
Edward S. Rogers Sr. Department of Electrical and Computer
Engineering

University of Toronto
October 2005 – 2021

Associate Chair – Research
Edward S. Rogers Sr. Department of Electrical and Computer
Engineering
University of Toronto
July 2009 – June 2012

Vice-Dean, Research
Faculty of Applied Science and Engineering
University of Toronto
July 2012 – June 2016

Vice-President, International
University of Toronto
July 2016 – June 2020

Vice-President, Research and Innovation
University of Toronto
July 2020 – December 2021

University Professor
Edward S. Rogers Sr. Department of Electrical and Computer
Engineering
University of Toronto
July 2015

Professor
Northwestern University
Department of Chemistry
Department of Electrical and Computer Engineering (Adjunct)
Sept 2021 -

Somorjai Visiting Miller Professor
University of California, Berkeley
August-Sept 2017

Distinguished Visiting Professor
Rowland Institute
Harvard University
April 2018

Honours and Awards

Awarded the University of Toronto's JJ Berry Smith Doctoral Supervision Award in 2020. This award honours active faculty members who, over a minimum of a 15-year period have demonstrated excellence in supervision at the University of Toronto by inspiring and guiding graduate students to reach excellence in scholarship;

Awarded the Killam Prize in Engineering from The Canada Council for the Arts in 2020. Up to 5 Killam Prizes are awarded each year for active Canadian scholars who have made a significant impact in their fields.

Awarded NSERC Brockhouse Canada Prize with Prof. Shana Kelley in Interdisciplinary Research and Engineering in 2016. The prize recognizes outstanding Canadian teams of researchers from different disciplines engaging in research, and drawing on their combined knowledge and skills to produce a record of excellent achievements in the natural sciences and engineering in the last six years.

Named University Professor, University of Toronto in 2015. The number of such appointments does not generally exceed 2% of tenured faculty.

Elected Fellow of the Royal Society of Canada (RSC) in 2014 in the Mathematics and Physical Sciences Division. *"Edward Sargent's research has resulted in advances in nanotechnology and materials chemistry, which he has translated into novel engineered devices for energy harvesting, light sensing, and medical diagnosis. He has pioneered solution-processed solar cells that absorb the sun's full spectrum, including both its visible and infrared components. He has also created exceedingly sensitive light detectors to enable image acquisition in low and infrared components. He has also created exceedingly sensitive light detectors to enable image acquisition in low light."* The RSC is Canada's senior National Academy, and exists to promote Canadian research and scholarly accomplishment.

Elected Fellow of the Canadian Academy of Engineering in 2014. The CAE is the national institution through which Canada's most distinguished and experienced engineers provide strategic advice on matters of critical importance to Canada. Members of the Academy are nominated and elected by their peers to honorary Fellowships in view of their distinguished achievements and career-long service to the engineering profession.

Awarded Steacie Prize 2012 for innovative research in solar cell technology. The Steacie Prize is awarded annually to one researcher, 40 years of age or younger who has made a notable contribution to research in Canada.

Named Fellow of the Institute of Electrical and Electronics Engineers (IEEE) in January 2011. "...for contributions to colloidal quantum dot optoelectronic devices." This distinction is reserved for select IEEE members with an extraordinary record of accomplishments in any of the IEEE fields of interest.

Elected Fellow of the American Association for the Advancement of Science (AAAS) in 2009 "...for distinguished contributions to the development of solar cells and light sensors based on solution-processed semiconductors."

Selected as one of "Scientific American 50" for 2004-2005. This award from Scientific American magazine honors annually 50 individuals, teams, companies, and other organizations whose accomplishments in research, business or policy making demonstrate outstanding technological leadership. The award is in recognition of his research leadership for contribution towards the technology of making solar cells from plastic.

Named one of “Canada’s Top 40 Under 40” for 2003/2004, a national program founded and managed by The Caldwell Partners to honour Canadians who have reached a significant level of success but have not yet reached the age of 40. In choosing the recipients, the Board considers the nominees’ achievements in the following areas: Vision and Leadership, Innovation and Achievement, Impact, Community Involvement and Contribution, Growth/Development Strategy.

Named “one of the world’s top young innovators” by MIT’s Technology Review. The TR100 is a group of 100 creative individuals under age 35, drawn from a broad spectrum of fields, whose research will shape how we live and work in the future. Prof. Sargent was profiled in the October 2003 issue of Technology Review magazine.

Honoured by the Canadian Institute for Advanced Research as one of Canada’s top twenty researchers under age forty. CIAR’s Top 20 competition is modeled on the Frontiers of Science program in the U.S. An international panel of six judges (three in the U.S. and three in the U.K.) selected twenty recipients spanning all fields of science and the social sciences.

Winner, 2002 Outstanding Engineer Award of the Institute of Electrical and Electronics Engineers (IEEE) Canada. The award recognizes a member of IEEE Canada who, through his/her technical and professional abilities, has made an outstanding contribution to the Electrical Engineering profession. Citation: *“For groundbreaking research in applying new phenomena and materials from nanotechnology towards transforming fibre-optic communications systems into agile optical networks.”*

The D. N. Chorafas Foundation Award. The Switzerland-based Chorafas Foundation awards scientific prizes worldwide for outstanding research in the engineering sciences, humanities and social sciences, medicine, and the natural science. In awarding Dr. Sargent the prize, the Chorafas Foundation Committee wrote: “Dr. Sargent proved that it is possible to harness the combined power of photons and electrons to make new, integrated, functionally sophisticated devices and circuits to enable the fibre-optic networks of the future.”

NSERC Silver Medal, 1999. NSERC wrote: “This work shed light for the very first time on the essential physical mechanisms that underlie the operation of the lateral current laser. The groundbreaking research proved that it is possible to build and interconnect these laser devices using standard semiconductor fabrication techniques, thereby opening up an avenue for making laser light the driving force of future microchips.”

Statement of Research Contributions and Impact

Citations: 91,021 [Scopus]
h-index: 154 [Scopus]

List of Publications

Books

1. E. H. Sargent, "The Dance of Molecules: How Nanotechnology is Changing our Lives," Penguin Group, Canada, October 2005.
2. E. H. Sargent, "Nanotechnology: Design in the Quantum Vernacular," Essay contribution to "Design and the Elastic Mind," book by P. Antonelli, Edited by L. Hruska, the Museum of Modern Art, New York, NY, 2008.
3. Editor (with G. Konstantatos), "Colloidal Quantum Dot Photovoltaics," Cambridge University Press, U.K, October 2013.

Refereed Journal Articles:

685. R. Zhao, T. Zhu, S. Wang, C. Jarrett-Wilkins, A.M. Najjarian, A.J. Lough, S. Hoogland, E.H. Sargent, "Engineering hydrogen bonding to align molecular dipoles in organic solids for efficient second harmonic generation," *Chemical Science*, 2022, *in press*.
684. T. Kose, C.P. O'Brien, J. Wicks, J. Abed, Y.C. Xiao, B. Sutherland, A. Sarkar, S.A. Jaffer, E.H. Sargent, D. Sinton, "High-throughput parallelized testing of membrane electrode assemblies for CO₂ reduction," *Catalysis Science and Technology*, 2022, *in press*.
683. S. Wang, T. Zhu, R. Sabatini, A. M. Najarian, M. Imran, R. Zhao, P. Xia, L. Zeng, S. Hoogland, D. S. Seferos, E. H. Sargent, "Engineering electro-optic BaTiO₃ nanocrystals via efficient doping," *Advanced Materials*, DOI:10.1002/adma.202207261, 2022.
682. Z. Yao, Y. Lum, A. Johnston, L. M. Mejia-Mendoza, X. Zhou, Y. Wen, A. Aspuru-Guzik, E. H. Sargent, Z. W. Seh, "Machine learning for a sustainable energy future," *Nature Reviews Materials*, DOI:10.1038/s41578-022-00490-5, 2022.
681. Y. Zhang, M. Vafaei, J. Xu, J. M. Pina, P. Xia, A. M. Najarian, O. Atan, M. Imran, K. Xie, S. Hoogland, E. H. Sargent, "Electron-transport layers employing strongly bound ligands enhance stability in colloidal quantum dot infrared photodetectors," *Advanced Materials*, DOI:10.1002/adma.202206884, 2022.
680. E.H. Sargent, "10 tips on how we write papers," *Matter*, vol. 5, no. 11, pp. 3562-3564, November 2022.
679. Y. Liu, A. Khusnutdinova, J. Chen, D. Crisante, K. Batyrova, K. Raj, M. Feigis, E. Shirzadi, X. Wang, R. Dorakhan , X. Wang, P.J. Stogios, A.F. Yakunin, E.H. Sargent, R. Mahadevan, "Systems engineering of Escherichia coli for n-butane production," *Metabolic Engineering*, vol. 74, pp. 98-107, November 2022.
678. S. Lee, S. M. Park, E. D. Jung, T. Zhu, J. M. Pina, H. Anwar, F. Wu, G. Chen, Y. Dong, T. Cui, M. Wei, K. Bertens, Y. Wang, B. Chen, T. Filletter, S. Hung, Y. Won, K. H. Kim, S. Hoogland, E. H. Sargent, "Dipole engineering through the orientation of interface molecules for efficient InP quantum dot light-emitting diodes," *Journal of the American Chemical Society*, vol. 144, no. 45, pp. 20923-20930, November 2022.
677. H. Chen, A. Maxwell, C. Li, S. Teale, B. Chen, T. Zhu, E. Ugur, G. Harrison, L. Grater, J. Wang, Z. Wang, L. Zeng, S. M. Park, L. Chen, P. Serles, R. A. Awani, B. Subedi, X. Zheng, C. Xiao, N. J. Podraza, T. Filletter, C. Liu, Y. Yang, J. M. Luther, S. De Wolf, M. G. Kanatzidis, Y. Yan, E. H. Sargent, Regulating surface potential maximizes voltage in all-perovskite tandems," *Nature*, DOI:10.1038/s41586-022-05541-z, November 2022.
676. D. Nam, O. Shekhah, A. Ozden, C. McCallum, F. Li, X. Wang, Y. Lum, T. Lee, J. Li, J. Wicks, A. Johnston, D. Sinton, M. Eddaoudi, E.H. Sargent, "High-rate and selective CO₂ electrolysis to ethylene via metal-organic-framework-augmented CO₂ availability," *Advanced Materials*, DOI: 10.1002/adma.202207088, October 2022.
675. H. Zargartalebi, H. Yousefi, C.D. Flynn, S. Gomis, J. Das, T.L. Young, E. Chien, S. Mubareka, A. McGeer, H. Wang, E.H. Sargent, A.S. Nezhad, S.O. Kelley, "Capillary-assisted molecular pendulum

bioanalysis," *Journal of the American Chemical Society*, vol. 144, no. 40, pp. 18338-18349, October 2022.

674. I.E.L. Stephens, K. Chan, A. Bagger, S. W. Boettcher, J. Bonin, E. Boutin, A. K. Buckley, R. Buonsanti, E.R. Cave, X. Chang, S.W. Chee, A.H.M. da Silva, P. de Luna, O. Einsle, B. Endrődi, M. Escudero-Escribano, J.V. Ferreira de Araujo, M.C. Figueiredo, C. Hahn, K.U. Hansen, S. Haussener, S. Hunegnaw, Z. Huo, Y.J. Hwang, C. Janáky, B.S. Jayathilake, F. Jiao, Z.P Jovanov, P. Karimi, M.T.M. Koper, K.P. Kuhl, P. Kendra, W.H. Lee, Z. Liang, X. Liu, S. Ma, M. Ma, H.-S. Oh, M. Robert, B.R. Cuenya, J. Rossmeisl, C. Roy, M.P. Ryan, E.H. Sargent, P. Sebastián-Pascual, B. Seger, L. Steier, P. Strasser, A.S. Varela, R.E. Vos, X. Wang, B. Xu, H. Yadegari, Y. Zhou, "2022 Roadmap on low temperature electrochemical CO₂ reduction," *Journal of Physical Energy*, vol. 4, no. 4, October 2022.
673. T.-H. Han, K.Y. Jang, Y. Dong, R.H. Friend, E.H. Sargent, T.-W. Lee, "A roadmap for the commercialization of perovskite light emitters," *Nature Reviews Materials*, vol. 7, no. 10, pp. 757-777, October 2022.
672. H. Chen, M. Wei, Y. He, J. Abed, S. Teale, E.H. Sargent, Z. Yang, "Germanium silicon oxide achieves multi-coloured ultra-long phosphorescence and delayed fluorescence at high temperature," *Nature Communications*, vol. 13, no. 1, August, 2022.
671. A.M. Najarian, M. Vafaie, A. Johnston, T. Zhu, M. Wei, M.I. Saidaminov, Y. Hou, S. Hoogland, F.P. Garcia de Arquer, E.H. Sargent, "Sub-millimetre light detection and ranging using perovskites," *Nature Electronics*, vol. 5, no. 8, pp. 511-518, August 2022.
670. J.M. Pina, M. Vafaie, D.H. Parmar, O. Atan, P. Xia, Y. Zhang, A.M. Najarian, F.P. Garcia de Arquer, S. Hoogland, E.H. Sargent, "Quantum-size-effect tuning enables narrowband IR photodetection with low sunlight interference," *Nano Letters*, vol. 22, no. 16, pp. 6802-6807, August 2022.
669. Y. Nah, D. Solanki, Y. Dong, J.A. Röhr, A.D. Taylor, S. Hu, E.H. Sargent, D.H. Kim, "Narrowing the phase distribution of quasi-2D perovskites for stable deep-blue electroluminescence," *Advanced Science*, vol. 9, no. 24, August 2022.
668. B. Sun, A.M. Najarian, L.K. Sagar, M. Biondi, M.-J. Choi, X. Li, L. Levina, S.-W. Baek, C. Zheng, S. Lee, A.R. Kirmani, R. Sabatini, J. Abed, M. Liu, M. Vafaie, P. Li, L.J. Richter, O. Voznyy, M. Chekini, Z.-H. Lu, F.P. Garcia de Arquer, E.H. Sargent, "Fast near-infrared photodetection using III-V colloidal quantum dots," *Advanced Materials*, vol. 34, no. 33, August 2022.
667. C. Wang, Y.-K. Wang, Z. Li, J. Luo, R. Sabatini, T. Zhang, E.H. Sargent, Z. Deng, "Single-layer sheets of alkylammonium lead iodide perovskites with tunable and stable green emission for white light-emitting devices," *Advanced Optical Materials*, vol. 10, no. 16, August 2022.
666. T.N. Nguyen, Z. Chen, A.S. Zeraati, H.S. Shiran, S.M. Sadaf, M.G. Kibria, E.H. Sargent, C.-T. Dinh, "Catalyst regeneration via chemical oxidation enables long-term electrochemical carbon dioxide reduction," *Journal of the American Chemical Society*, vol. 144, no. 29, pp. 13254-13265, July 2022.
665. A. Ozden, F.P. Garcia de Arquer, J.E. Huang, J. Wicks, J. Sisler, R.K. Miao, C.P. O'Brien, G. Lee, X. Wang, A.H. Ip, E.H. Sargent, D. Sinton, "Carbon-efficient carbon dioxide electrolyzers," *Nature Sustainability*, vol. 5, no. 7, pp. 563-573, July 2022.
664. Y. Xu, R.K. Miao, J.P. Edwards, S. Liu, C.P. O'Brien, C.M. Gabardo, M. Fan, J.E. Huang, A. Robb, E.H. Sargent, D. Sinton, "A microchanneled solid electrolyte for carbon-efficient CO₂ electrolysis," *Joule*, vol. 6, no. 6, pp. 1333-1343, June 2022.
663. Y. Xie, P. Ou, X. Wang, Z. Xu, Y.C. Li, Z. Wang, J.E. Huang, J. Wicks, C. McCallum, N. Wang, Y. Wang, T. Chen, B.T.W. Lo, D. Sinton, J.C. Yu, Y. Wang, E.H. Sargent, "High carbon utilization in CO₂ reduction to multi-carbon products in acidic media," *Nature Catalysis*, vol. 5, no. 6, pp. 564-570, June 2022.

662. X. Li, D. Luo, P.B. Green, C. Qiu, M. Wei, H. Yu, E.H. Sargent, M.W.B. Wilson, Z.-H. Lu, "Vapor-phase deposition of highly luminescent embedded perovskite nanocrystals," *Advanced Optical Materials*, vol. 10, no. 11, June 2022.
661. K. Lin, C. Yan, R.P. Sabatini, W. Feng, J. Lu, K. Liu, D. Ma, Y. Shen, Y. Zhao, M. Li, C. Tian, L. Xie, E.H. Sargent, Z. Wei, "Dual-phase regulation for high-efficiency perovskite light-emitting diodes," *Advanced Functional Materials*, vol. 32, no. 24, June 2022.
660. Y. Xu, R.K. Miao, J.P. Edwards, S. Liu, C.P. O'Brien, C.M. Gabardo, M. Fan, J.E. Huang, A. Robb, E.H. Sargent, D. Sinton, "A microchanneled solid electrolyte for carbon-efficient CO₂ electrolysis, Joule", vol. 6, no. 6, pp. 1333-1343, June 2022.
659. K. Xie, R.K. Miao, A. Ozden, S. Liu, Z. Chen, C.-T. Dinh, J.E. Huang, Q. Xu, C.M. Gabardo, G. Lee, J.P. Edwards, C.P. O'Brien, S.W. Boettcher, D. Sinton, E.H. Sargent, "Bipolar membrane electrolyzers enable high single-pass CO₂ electroreduction to multicarbon products," *Nature Communications*, vol. 13, no. 1, June 2022.
658. K. Xie, A. Ozden, R.K. Maio, Y. Li, D. Sinton, E.H. Sargent, "Elminating the need for anodic gas separation in CO₂ electroreduction systems via liquid-to-liquid anodic upgrading," *Nature Communications*, vol. 13, no. 1, June 2022.
657. Z. Wang, H. Wang, S. Lin, S. Ahmed, S. Angers, E.H. Sargent, S.O. Kelley, "Nanoparticle amplification labeling for high-performance magnetic cell sorting," *Nano Letters*, vol. 22, no. 12, pp. 4774-4783, May 2022.
656. H. Choubisa, J. Abed, D. Mendoza, Z. Yao, Z. Wang, B. Sutherland, A. Aspuru-Guzik, E.H. Sargent, "Accelerated chemical space search using a quantum-inspired cluster expansion approach," *arXiv*, May 2022.
655. Y.-K. Wang, K. Singh, J.-Y. Li, Y. Dong, X.-Q. Wang, J.M. Pina, Y.-J. Yu, R. Sabatini, Y. Liu, D. Ma, J. Liu, Z. Liu, Y. Gao, O. Voznyy, W. Ma, M.-K. Fung, L.-S. Liao, E.H. Sargent, "In situ inorganic ligand replenishment enables bandgap stability in mixed-halide perovskite quantum dot solids," *Advanced Materials*, vol. 34, no. 21, May 2022.
654. H. Anwar, A. Johnston, S. Mahesh, K. Singh, Z. Wang, D.A. Kuntz, I. Tamblyn, O. Voznyy, G.G. Prive, E.H. Sargent, "High-throughput evaluation of emission and structure in reduced-dimensional perovskites," *ACS Central Science*, vol. 8, no. 5, pp. 571-580, May 2022.
653. B. Chen, E.H. Sargent, "What does net zero by 2050 mean to the solar energy materials researcher?" *Matter*, vol. 5, no. 5, pp. 1322-1325, May 2022.
652. H. Chen, S. Teale, B. Chen, Y. Hou, L. Grater, T. Zhu, K. Bertens, S.M. Park, H.R. Atapattu, Y. Gao, M. Wei, A.K. Johnston, Q. Zhou, K. Xu, D. Yu, C. Han, T. Cui, E.H. Jung, C. Zhou, W. Zhou, A.H. Proppe, S. Hoogland, F. Laquai, T. Filleteer, K.R. Graham, Z. Ning, E.H. Sargent, "Quantum-size-tuned heterostructures enable efficient and stable inverted perovskite solar cells," *Nature Photonics*, vol. 16, no. 5, pp. 352-358, May 2022,
651. Z. Li, Z. Deng, A. Johnston, J. Luo, H. Chen, Y. Dong, R. Sabatini, E.H. Sargent, "Precursor tailoring enables alkylammonium tin halide perovskite phosphors for solid-state lighting," *Advanced Functional Materials*, vol. 32, no. 18, May 2022.
650. A.S. Rasouli, X. Wang, J. Wicks, C.T. Dinh, J. Abed, F. Wu, S. Hung, K. Bertens, J.E. Huang, E.H. Sargent, "Ga doping disrupts C-C coupling and promotes methane electroproduction on CuAI catalysts," *Chem Catalysis*, vol. 2, no. 4, pp. 908-916, April 2022.
649. D.H. Parmar, J.M. Pina, T. Zhu, M. Vafaie, A. Ozan, M. Biondi, A.M. Najjariyan, S. Hoogland, E.H. Sargent, "Controlled crystal plane orientations in the ZnO transport layer enable high-responsivity, low-dark-current infrared photodetectors," *Advanced Materials*, vol. 34, no. 17, p. 2200321, April 2022.
648. H. Ebe, Y.-K. Wang, N. Shinotsuka, Y.-H. Cheng, M. Uwano, R. Suzuki, Y. Dong, D. Ma, S. Lee, T. Chiba, E.H. Sargent, "Energy transfer between size-controlled CsPbI₃Quantum dots for light-

- emitting diode application," ACS Applied Materials and Interfaces, vol. 14, no. 15, pp. 17691-17697, April 022.
647. Y. Liu, Z. Li, J. Xu, Y. Dong, B. Chen, S. Park, D. Ma, S. Lee, J.E. Huang, S. Teale, O. Voznyy, E.H. Sargent, "Wide-bandgap perovskite quantum dots in perovskite matrix for sky-blue light-emitting diodes," Journal of the American Chemical Society, vol. 144, no. 9, pp. 4009-4016, March 2022.
646. R. Lin, J. Xu, M. Wei, Y. Wang, Z. Qin, Z. Liu, J. Wu, K. Xiao, B. Chen, S. Park, G. Chen, H.R. Atapattu, K.R. Graham, J. Xu, J. Zhu, L. Li, C. Zhang, E.H. Sargent, H. Tan, "All-perovskite tandem solar cells with improved grain surface passivation," Nature, vol. 603, no. 7899, p. 73-78, March 2022.
645. Y. Li, A. Ozden, W.R. Leow, P. Ou, J.E. Huang, Y. Wang, K. Bertens, Y. Xu, Y. Liu, C. Roy, H. Jiang, D. Sinton, C. Li, E.H. Sargent, "Redox-mediated electrosynthesis of ethylene oxide from CO₂ and water," Nature Catalysis, vol. 5, no. 3, pp. 185-192, March 2022.
644. S.-F. Hung, A. Xu, X. Wang, F. Li, S.-H. Hsu, Y. Li, J. Wicks, E.G. Cervantes, A.S. Rasouli, Y.C. Li, M. Luo, D.-H. Nam, N. Wang, T. Peng, Y. Yan, G. Lee, E.H. Sargent, "A metal-supported single-atom catalytic site enables carbon dioxide hydrogenation," Nature Communications, vol. 13, no. 1, February 2022.
643. X. Wang, P. Ou, A. Ozden, S.-F. Hung, J. Tam, C.M. Gabardo, J.Y. Howe, J. Sisler, K. Bertens, F.P. Garcia de Arquer, R.K. Miao, C.P. O'Brien, Z. Wang, J. Abed, A.S. Rasouli, M. Sun, A.H. Ip, D. Sinton, E.H. Sargent, "Efficient electrosynthesis of n-propanol from carbon monoxide using a Ag-Ru-Cu catalyst," Nature Energy, vol. 7, no. 2, pp. 170-176, February 2022.
642. D. Wakerley, S. Lamaison, J. Wicks, A. Clemens, J. Feaster, D. Corral, S.A. Jaffer, A. Sarkar, M. Fontecave, E.B. Duoss, S. Baker, E.H. Sargent, T.F. Jaramillo, C. Hahn, "Gas diffusion electrodes, reactor designs and key metric of low-temperature CO₂ electrolyzers," Nature Energy, vol. 7, no. 2, pp. 130-143, February 2022.
641. Z. Wang, S. Ahmed, M. Labib, H. Wang, X. Hu, J. Wei, Y. Yao, J. Moffat, E.H. Sargent, S.O. Kelley, "Efficient recovery of potent tumour-infiltrating lymphocytes through quantitative immunomagnetic cell sorting," Nature Biomedical Engineering, vol. 6, no. 2, pp. 108-117, February 2022.
640. Y. Zhong, A.R. Kirmani, X. Lan, J. Carpenter, A. Rong-Hui Chew, O. Awartani, L. Yu, M.R. Niazi, O. Voznyy, H. Hu, G.O. Ngongang Ndjawa, M.L. Tietze, A. Salleo, H. Ade, E.H. Sargent, A. Amassian, "Conjugated polymers with controllable interfacial order and energetics enable tunable heterojunctions in organic and colloidal quantum dot photovoltaics," Journal of Materials Chemistry A, vol. 10, no. 4, pp. 1788-1801, January 2022.
639. Q. Wu, X. Gong, D. Zhao, Y.-B. Zhao, F. Cao, H. Wang, S. Wang, J. Zhang, R. Quintero-Bermudez, E.H. Sargent, X. Yang, "Efficient tandem quantum-dot LEDs enabled by an inorganic semiconductor-metal-dielectric interconnecting layer stack," Advanced Materials, vol. 34, no. 4, January 2022.
638. X.-H. Bu, N.B. Shustova, E.H. Sargent, "Editorial for the Special issue: Dimensionality of Emerging Materials and Energy," Advanced Energy Materials, vol. 12, no. 4, January 2022.
637. H. Chen, J.M. Pina, Y. Hou, E.H. Sargent, "Synthesis, applications, and prospects of quantum-dot-in-perovskite solids," Advanced Energy Materials, vol. 12, no. 4, pp. 2100774 (9pp.) January 2022.
636. D.N. Philpott, S. Gomis, H. Wang, R. Atwal, A. Kelil, T. Sack, B. Morningstar, C. Burnie, E.H. Sargent, S. Angers, S. Sidhu, S.O. Kelley, "Rapid on-cell selection of high-performance human antibodies," ACS Central Sciences, vol. 8, no. 1, pp. 102-109, January 2022.
635. A. Robb, A. Ozden, R.K. Miao, C.P. O'Brien, Y. Xu, C.M. Gabardo, X. Wang, N. Zhao, F.P. Garcia de Arquer, E.H. Sargent, D. Sinton, "Concentrated ethanol electrosynthesis from CO₂ via a porous

- hydrophobic adlayer," *ACS Applied Materials and Interfaces*, vol. 14, no. 3, pp. 4155-4162, January 2022.
634. J. Yang, S.C. Cho, S. Lee, J.W. Yoon, W.H. Jeong, H. Song, J.T. Oh, S.G. Lim, S.Y. Bae, B.R. Lee, M. Ahmadi, E.H. Sargent, W. Yi, S.U. Lee, H. Choi, "Guanidinium-pseudohalide perovskite interfaces enable surface reconstruction of colloidal quantum dots for efficient and stable photovoltaics," *ACS Nano*, vol. 16, no. 1, pp. 1649-1660, January 2022.
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