YANG SHAO-HORN

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Professor Shao-Horn is the W.M. Keck Professor of Energy at the Massachusetts Institute of Technology (M.I.T.), as well as, a Professor of Mechanical Engineering, and Materials Science and Engineering. Professor Shao-Horn earned her B.S. degree from Beijing University of Technology and her Ph.D. degree from Michigan Technological University both in Metallurgical and Materials Engineering. She joined the M.I.T. faculty in 2002.

Professor Shao-Horn's research programs are centered on exploiting chemical/materials physics and physical/materials chemistry principles to understand charge transfer at the solid-gas and solid-liquid interface, which is used to design materials/processes and control the kinetics of (electro)chemical reactions, critical to enable the deployment of clean air and clean energy technologies. Professor Shao-Horn and coworkers have pioneered the use of electronic structure to develop universal guiding principles, and design interfaces with activity, reactivity and stability to enhance function/performance across a number of applications spanning from oxidation of air pollutants, making of sustainable or solar fuels via water splitting, CO_2 reduction or nitrogen reduction (Hwang et al., Science 2017), to charge transfer at the electrode/electrolyte interface of rechargeable lithium-ion and lithium-air batteries. Research programs include experimental and computational components including synthesis, (electro)chemical measurements, synchrotron X-ray diffraction and spectroscopy, electron- and light-based imaging and spectroscopy, and Density Functional Theory computation. Professor Shao-Horn and coworkers are highly interdisciplinary and collaborating closely with other leading labs and private sectors in chemical, automotive, and energy industry. Select research results from the past few years are described in detail below.

Professor Shao-Horn and her coworkers have tuned the oxide electronic structure to develop active and non-precious-metal-containing catalysts to promote oxygen reduction and evolution kinetics (accounting for ~75% of total energy loss), which is central to achieve high efficiencies of water-splitting devices, fuel cells, and metal-air batteries. The oxide electronic structure features, more specifically the energy levels of metal d and O p density of states (DOS), dictate the filling of antibonding orbitals on metal and oxygen sites, metal-oxygen covalency, and the binding strength with reaction intermediates, which influences the reaction energetic barrier for the rate-limiting step and thus reaction kinetics. Also, Shao-Horn and her collaborators have shown that the antibonding orbital filling ("e_g" 3d electron) of surface transition-metal cations controls the catalytic activity of oxides for oxygen reduction (Suntivich et al. Nature Chemistry 2011) and oxygen evolution (Suntivich et al. Science 2011) in a volcano-shaped dependence over several orders of magnitude. Applying this principle to design new oxide chemistry has led to intrinsic oxygen evolution activity greater than start-of-the art IrO_2 (Suntivich et al. Science 2011) and record intrinsic oxygen reduction activity for non-precious-metal-based catalysts known to date (Stoerzinger et al. JPCL 2015). Recently, Shao-Horn and her coworkers have established criteria to obtain high stability and activity of most active catalysts for oxygen evolution, where increasing the metal-oxygen covalency (smaller energy gap between metal d and O 2p states) enhances activity but beyond an optimal value reduces oxide stability (May et al. JPCL 2012 and Grimaud et al. Nature Comm 2013). Exploiting this concept to examine a series of oxides not only sets record catalytic activity but also establishes a new reaction mechanism for the most active oxides, where both metal and oxygen sites can catalyze oxygen evolution (Grimaud et al. Nature Chemistry 2017) and deprotonation from oxide surface can be rate-limiting (Hong et al. EES

2017) – contrary to long-standing belief. Therefore, tuning metal-covalency points to a new direction to increase oxide activity and stability. Recently, such concepts have been applied in the design of surfaces to suppress the dehydrogenation of electrolytes to enhance the lifetime and safety of high-energy Li-ion batteries (Giordano et al. JPCL 2017).

Professor Shao-Horn and her coworkers have made notable contributions to advance the development of fuel cells for consumer vehicles. Her work on the mechanism of Pt catalyst loss in fuel cells in collaboration with GM has contributed to prolonging the lifetime of fuel cells from hundreds to thousands of hours and to the first commercialization of fuel-cell-powered vehicle, Mirai, by Toyota in 2015. In addition, Shao-Horn and her coworkers have established the degradation mechanisms of Pt and Pt alloy nanoparticles in fuel cells (Ferreira et al. JES 2005 and Chen et al. JES 2010). Recent work has demonstrated record ORR activity for Pt alloy catalysts in fuel cells exceeding the target set by US Department of Energy for 2017 by teaming up with GM and Johnson Matthey (EES 2015).

Professor Shao-Horn is a member of the National Academy of Engineering, and is among the World's Most Influential Scientific Minds and *Highly Cited Researchers* (Thomson Reuters) based on 250+ archival journal papers and 200+ invitations for keynote and plenary lectures in academia (e.g. Marvel Lecture 2017), industrial events (e.g., BASF Energy Symposium in 2015) and high-level strategic meetings (e.g., Ideaslab of World Economic Forum in Davos 2017). She has advised ~90 students and postdoctoral associates at MIT, who are now pursuing successful careers in industry, national research laboratories, and in academia (~25) including faculty positions at MIT and Cornell, as well as, academic positions in Europe and Asia.

Professor Shao-Horn's leadership and service contributions include: Co-Director for Center for Energy Storage at MIT; Energy Area Head, MIT Mechanical Engineering; National Science Foundation Interdisciplinary Leader and MIT Presidential Energy Research Council. In addition, she has been serving on the advisory boards of private/public organizations and leading journals in energy science and physical chemistry including American Chemical Society Journal of Physical Chemistry, Royal Society of Chemistry Energy and Environmental Science, Wiley Advanced Energy Materials, and Cell Press Chem and Joule. Moreover, Professor Shao-Horn has received honors including the Charles Tobias Young Investigator Award, the Battery Division Research Award and Fellowship from the Electrochemical Society, the Tajima Prize from the International Society of Electrochemistry, the Research Award by the International Battery Association, the Faraday Medal from Royal Society of Chemistry, and has been elected as a Fellow from the American Association for the Advancement of Science, the Royal Society of Chemistry, International Society of Electrochemistry, and the Electrochemical Society.

Representative Publications of Yang Shao-Horn

1. Huang, M., S. Feng, Y. Shao-Horn, and J.A. Johnson, Fluorinated Aryl Sulfonimide Tagged (FAST) salts: modular synthesis and structure–property relationships for battery applications, *Energy & Environmental Science*, DOI: 10.1039/C7EE03509H March 2018.
2. Kuznetsov, D.A., B. Han, Y. Yu, R.R. Rao, J. Hwang, Y. Román-Leshkov, and Y. Shao-Horn, Tuning Redox Transitions via Inductive Effect in Metal Oxides and Complexes, and Implications in Oxygen Electrocatalysis**,** *Joule*, 2, 225-244 February 2018.
3. Rao, R.R., M.J. Kolb, N.B. Halck, A.F. Pedersen, A. Mehta, H. You, K.A. Stoerzinger, Z. Feng, H.A. Hansen, H. Zhou, L. Giordano, J. Rossmeisl, T. Vegge, I. Chorkendorff, I.E.L. Stephens, and Y. Shao-Horn, Towards identifying the active sites on RuO_2(110) in catalyzing oxygen evolution, *Energy & Environmental Science*, 10, 2626-2637 December 2017.
4. Hwang, J., R.R. Rao, L. Giordano, Y. Katayama, Y. Yu, and Y. Shao-Horn, Perovskites in Catalysis and Electrocatalysis, *Science*, 358, 751-756 November 2017.
5. Feng, S., M. Chen, L. Giordano, M. Huang, W. Zhang, C.V. Amanchukwu, R. Anandakathir, Y. Shao-Horn, and J.A. Johnson, Mapping a stable solvent structure landscape for aprotic Li–air battery organic electrolytes, *Journal of Materials Chemistry A*, 5, 23987-23998 November 2017.
6. Hong, W., K.A. Stoerzinger, Y-L. Lee, L. Giordano, A.J.L. Grimaud, A.M. Johnson, J. Hwang, E. Crumlin, W. Yang, Y. Shao-Horn, Charge-transfer-energy-dependent oxygen evolution reaction mechanisms for perovskite oxides, *Energy & Environmental Science*, 10, 2190-2200 October 2017.
7. Tulodziecki, M., G.M. Leverick, C.V. Amanchukwu, Y. Katayama, D.G. Kwabi, F. Bardé, P.T. Hammond and Y. Shao-Horn, The role of iodide in the formation of lithium hydroxide in lithium-oxygen batteries, *Energy & Environmental Science*, 10, 1828-1842 August 2017.
8. Hong, W., K.A. Stoerzinger, Y-L. Lee, L. Giordano, A.J.L. Grimaud, A.M. Johnson, J. Hwang, E. Crumlin, W. Yang, Y. Shao-Horn, Charge-transfer-energy-dependent oxygen evolution reaction mechanisms for perovskite oxides, *Energy & Environmental Science*, 10, 2190-2200 October 2017.
9. Giordano, L., P. Karayaylali, Y. Yu, Y. Katayama, F. Maglia, S. Lux, and Y. Shao-Horn, Chemical Reactivity Descriptor for the Oxide-Electrolyte Interface in Li-Ion Batteries, *Journal of Physical Chemistry Letters*, 8, 3881-3887 August 2017.
10. Risch, M., K. A. Stoerzinger, B. Han, T.Z. Regier, D. Peak, S. Y. Sayed, C. Wei, Z. Xu, and Y. Shao-Horn, Redox Processes of Manganese Oxide in Catalyzing Oxygen Evolution and Reduction: An in Situ Soft X-ray Absorption Spectroscopy Study, *Journal of Physical Chemistry C*, 121, 17682-17692 August 2017.
11. Grimaud, A., O. Diaz-morales, B.H. Han, W. T. Hong, Y.L. Lee, L. Giordano, K. A. Stoerzinger, M.T.M. Koper, Y. Shao-Horn, Activating lattice oxygen redox reactions in metal oxides to catalyze oxygen evolution, *Nature Chemistry*, 9, 457-465 May 2017.
12. Han, B., K.A. Stoerzinger, V. Tileli, A.D. Gamalski, E.A. Stach, and Y. Shao-Horn, Nanoscale Structural Oscillations in Perovskite Oxides Induced by Oxygen Evolution, *Nature Materials*, 16, 121-126 January 2017.
13. Bachman, J., S. Muy, Grimaud, A., H.H. Chang, N. Pour, S. Lux, O. Paschos, F. Maglia, S. Lupart, P. Lamp, L. Giordano and Y. Shao-Horn, Inorganic Solid-State Electrolytes for Lithium Batteries: Mechanisms and Properties Governing Ion Conduction, *Chemical Reviews*, 116, 140-162 January 2016.
14. Kwabi, D., V.S. Bryantsev, T.P. Batcho, D. Itkis, C.V. Thompson and Y. Shao-Horn,

Experimental and Computational Analysis of the Solvent-Dependent O_2/Li^+-O_2^- Redox Couple: Standard Potentials, Coupling Strength and Implications for Lithium-Oxygen Batteries, *Angewandte Chemie International Edition*, 128, 3181-3186 February 2016.

15. Gauthier, M., T.J. Carney, A. Grimaud, L. Giordano, N. Pour, H.-H. Chang, D.P. Fenning, S.F. Lux, O. Paschos, C. Bauer, F. Maglia, S. Lupart, P. Lamp, and Y. Shao-Horn, The Electrode-Electrolyte Interface in Li-ion Batteries: Current Understanding and New Insights, *Journal of Physical Chemistry Letters*, 6, 4653-4672 October 2015.
16. Hong, W.T., M. Risch, K.A. Stoerzinger, A. Grimaud, J. Suntivich, and Y. Shao-Horn, Toward the Rational Design of Non-precious Transition Metal Oxides for Oxygen Electrocatalysis, *Energy & Environmental Science*, 8, 1404-1427 2015.
17. Stoerzinger, K.A., W.T. Hong, G. Azimi, L. Giordano, Y.L. Lee, E.J. Crumlin, M.D. Biegalski, H. Bluhm, K.K. Varanasi, and Y. Shao-Horn, Reactivity of Perovskites with Water: Role of Hydroxylation in Wetting and Implications for Oxygen Electrocatalysis, *Journal of Physical Chemistry C*, 119, 18504-18512 2015.
18. Hong, W.T., K.A. Stoerzinger, B. Mortiz, T.P. Devereaux, W.Yang, and Y. Shao-Horn, Probing $LaMO_3$ Metal and Oxygen Partial Density of States Using X-ray Emission, Absorption, and Photoelectron Spectroscopy, *Journal of Physical Chemistry C*, 119, 2063-2072 2015.
19. Han, B., C.E. Carlton, A. Kongkanand, R.S. Kukreja, B.R.C. Theobald, L. Gan, R. O'Malley, P. Strasser, F.T. Wagner, and Y. Shao-Horn, Record Activity and Stability of Dealloyed Bimetallic Catalysts for Proton Exchange Membrane Fuel Cells, *Energy & Environmental Science*, 8, 258-266 2015.
20. Elias, J., S., M. Risch, L. Giordano, A.N. Mansour, and Y. Shao-Horn, Structure, Bonding and Catalytic Activity of Monodisperse, Transition-Metal-Substituted CeO_2 Nanoparticles, *Journal of the American Chemical Society*, 136, 17193-17200 2014.
21. Feng, Z., Y. Yacoby, M.J. Gadre, Y.L. Lee, W.T. Hong, H. Zhou, M.D. Biegalski, H.M. Christen, S.B. Adler, D. Morgan, and Y. Shao-Horn, Anomalous Interface and Surface Strontium Segregation in $(La_{1-y}Sr_y)_2CoO_{4\pm\delta}/La_{1-x}Sr_xCoO_{3-\delta}$ Heterostructured Thin Films, *Journal of Physical Chemistry Letters*, 5, 1027-1034 2014.
22. Grimaud, A., K.J. May, C.E. Carlton, Y.L. Lee, M. Risch, W. Hong, J. Zhou and Y. Shao-Horn, Double Perovskite as a Family of Highly Active Catalysts for Oxygen Evolution in Alkaline Solution, *Nature Communications*, 4, 2439 2013.
23. Suntivich, J., Z. Xu, C.E. Carlton, J. Kim, B. Han, S.W. Lee, N. Bonnet, N. Marzari, L.F. Allard, H.A. Gasteiger, K. Hamad-Schifferli, Yang Shao-Horn, Surface Composition Tuning of Au-Pt Bimetallic Nanoparticles for Enhanced Carbon Monoxide and Methanol Electro-oxidation, *Journal of the American Chemical Society*, 135, 7985-7991 2013.
24. Mutoro, E., E.J. Crumlin, H. Pöpke, B. Luerssem, M. Amati, M. K. Abyaneh, M.D. Biegalski, H. M. Christen, L. Gregoratti, J. Janek and Y. Shao-Horn, Reversible Compositional Control of Oxide Surfaces by Electrochemical Potentials, *Journal of Physical Chemistry Letters*, 3, 40 - 44 2012.
25. Suntivich, J., H.A. Gasteiger, N. Yabuuchi, H. Nakanishi, J.B. Goodenough and Y. Shao-Horn, Design Principles for Oxygen Reduction Activity on Perovskite Oxide Catalysts for Fuel Cells and Metal-Air Batteries, *Nature Chemistry*, 3, 546–550 2011.
26. Suntivich, J., K.J. May, H.A. Gasteiger, J.B. Goodenough and Y. Shao-Horn, A Perovskite Oxide Optimized for Oxygen Evolution Catalysis from Molecular Orbital Principles, *Science*, 334, 1383-1385 2011.
27. Lee, Y. L., J. Kleis, J. Rossmeisl, Y. Shao-Horn and D. Morgan, Prediction of Solid Oxide Fuel Cell Cathode Activity with First-Principles Descriptors, *Energy & Environmental Science*, 4, 3966-3970 2011.

28. Crumlin, E.J, E. Mutoro, S.J. Ahn, G.J. la O', D. N. Leonard, A. Borisevic, M. D. Biegalski, H. M. Christen, Y. Shao-Horn, Oxygen Reduction Kinetics Enhancement on a Hetero-Structured Oxide Surface for Solid Oxide Fuel Cells, *Journal of Physical Chemistry Letters*, 1, 3149–3155 2010.
29. Lee, S.W., N. Yabuuchi, G.M. Gallant, S. Chen, B.S. Kim, P.T. Hammond and Y. Shao-Horn, High-Power Lithium Batteries from Functionalized Carbon-Nanotube Electrodes, *Nature Nanotechnology*, 5, 531–537 2010.
30. Chen, S., W.C. Sheng, N. Yabuuchi, P.J. Ferreira, L.F. Allard and Y. Shao-Horn, The Origin of Oxygen Reduction Activity of "Pt_3Co" Nanoparticles: Atomically Resolved Chemical Compositions and Structures, *Journal of Physical Chemistry C*, 113, 1109–1125 2009.
31. Ferreira, P.J., G.J. la O', Y. Shao-Horn, D. Morgan, R. Makharia, S. Kocha and H. Gasteiger, Instability of Pt/C Electrocatalysts in Proton Exchange Membrane Fuel Cells: A Mechanistic Investigation, *Journal of the Electrochemical Society*, 152, A2256–A2271 2005.

Selected Lectures of Yang Shao-Horn

Professor Shao-Horn has given 200+ invited, keynote and plenary lectures at university seminars, national and international conferences and events.

1. November 2017, "Energy Storage for Clean Energy", **Keynote**, 2017 Boston Science and Technology Summit, Chinese Association of Science and Technology, BOSTON 2017 Annual Convention, Boston, MA.
2. September 2017, "Towards Mastering Catalysis for Chemical Energy Storage" Invited, ACS Publication Symposium, Dalian, China.
3. September 2017, "The Future of Electrochemistry", **Marvel Lecture**, EPFL, Lausanne, Switzerland.
4. January 2017, "A Grand Challenge: Energy Storage", **IdeasLab**, World Economic Forum, Davos, Switzerland.
5. August 2016, "Oxygen electrochemistry for Chemical Storage", **Keynote**, Inauguration of Villum Center for the Science of Sustainable Fuels and Chemicals, Denmark.
6. October 2015, "Activating Oxygen Chemistry of Energy Storage", **BASF Lectureship**, UC Berkeley, CA.
7. March 2015, Oxygen Electrochemistry and Design of Oxides for Clean Energy and Clean Environment, **Keynote**, BASF Energy Symposium for 150 Year Celebration, Ludwigshafen, Germany.
8. January 2015, "Enabling Oxides for Oxygen Electrocatalysis," **Faculty Distinguished Lecture**, Chinese University of Hong Kong, Hong Kong, China.
9. August 2014, "Enabling Oxides for Oxygen Electrocatalysis," **Plenary**, International Society of Electrochemistry, Lausanne Switzerland.
10. July 2014, Design Principles of Oxides for Oxygen Electrocatalysis, **Keynote**, Nano2014, Moscow, Russia.
11. June 2014, "The Solvation Influence on the Oxygen Redox for Rechargeable Li-air Batteries", **Plenary**, IMLB 2014, Como, Italy.
12. February 2013, Oxygen Electrolysis on Oxides for Clean Energy Applications, **Plenary Lecture**, Zing Conference on Electrochemistry, Canary Islands, Spain.
13. September 2012, "Electrocatalysis on Oxide Surfaces", Symposium on the Future of Catalysis, Stanford University, Palo Alto, CA.
14. May 2012, "Challenges in Oxygen Electrocatalysis for Electrochemical Storage and Conversion," EMC^2 Seminar, Cornell University, Ithaca, NY.
15. February 2012, "Design Principles for Oxygen Reduction and Evolution on Oxide Catalysts," **Plenary**, APS March National Meeting, Boston, MA.
16. October 2011, "O_2 Electrocatalysis for Fuel Cells and Li-Air Battery Applications", **Keynote**, the Electrochemical Society Fall meeting, Boston, MA.
17. February 2011, "Challenges for Electrochemical Energy and Conversion and Storage", MESA, University of Twente, Netherlands.
18. May 2010, "Materials Research for Electrochemical Conversion and Storage", Materials Science and Engineering, California Institute of Technology, Pasadena, CA.

Full Publications of Yang Shao-Horn

Professor Shao-Horn and coworkers have published 250+ peer-reviewed archival journal publications and is a co-inventor on a number of issued and pending Patents. Professor Shao-Horn has advised ~90 M.S. and Ph.D. students, and postdoctoral researchers.

1. Chaudhuri, A., L. Mandal, X. Chi, M. Yang, M. C. Scott, M. Motapothula, X. J. Yu, P. Yang, Y. Shao-Horn, T. Venkatesan, A. T. S. Wee, and A. Rusydi**,** Direct observation of anisotropic small-hole polarons in an orthorhombic structure of BiVO4 films, Physical Review B, Accepted Article April 2018.
2. Muy, S., J. C. Bachman, L. Giordano, H-H. Chang, D. L. Abernathy, D. Bansal, O. Delaire, S. Hori, R. Kanno, F. Maglia, S. Lupart, P. Lamp, and Y. Shao-Horn, Tuning mobility and stability of lithium ion conductors based on lattice dynamics, Energy & Environmental Science, 11, 850-859 April 2018.
3. Han, B., A. Grimaud, L. Giordano, W. T. Hong, O. Diaz-Morales, L. Yueh-Lin, J. Hwang, N. Charles, K. A. Stoerzinger, W. Yang, M. T. M. Koper, and Y. Shao-Horn, Iron-Based Perovskites for Catalyzing Oxygen Evolution Reaction, Journal of Physical Chemistry C, 122, 8445-8454 April 2018.
4. Bamgbopa, M.O., Y. Shao-Horn, R. Hashaikeh, and S. Almheiri, Cyclable membraneless redox flow batteries based on immiscible liquid electrolytes: Demonstration with all-iron redox chemistry, Electrochemica Acta, 267, 41-50 March 2018.
5. Huang, M., S. Feng, Y. Shao-Horn, and J.A. Johnson, Fluorinated Aryl Sulfonimide Tagged (FAST) salts: modular synthesis and structure–property relationships for battery applications, Energy & Environmental Science, DOI: 10.1039/C7EE03509H March 2018.
6. Kuznetsov, D.A., B. Han, Y. Yu, R.R. Rao, J. Hwang, Y. Román-Leshkov, and Y. Shao-Horn, Tuning Redox Transitions via Inductive Effect in Metal Oxides and Complexes, and Implications in Oxygen Electrocatalysis**,** Joule, 2, 225-244 February 2018.
7. Mounfield III, W.P., A. Garg, Y. Shao-Horn, and Y. Román-Leshkov, Electrochemical Oxygen Reduction for the Production of Hydrogen Peroxide, Chem, 4, 18-19 January 2018.
8. Stoerzinger, K.A., W.T. Hong, X.R. Wang, R.R. Rao, S.B. Subramanyam, C. Li, Ariando, T. Venkatesan, Q. Liu, E.J. Crumlin, K.K. Varanasi, and Y. Shao-Horn, Decreasing Hydroxylation Affinity of $La_{(1-x)}Sr_xMnO_3$ Perovskites to Promote Oxygen Reduction Electrocatalysis, Chemistry of Materials, 29, 9990-9997 December 2017.
9. Mustafa, I., M.O. Bamgbopa, E. Alraeesi, Y. Shao-Horn, H. Sun, and S. Almheiri, Insights on the Electrochemical Activity of Porous Carbonaceous Electrodes in Non-Aqueous Vanadium Redox Flow Batteries, 164, A3673-A3683 December 2017.
10. Rao, R.R., M.J. Kolb, N.B. Halck, A.F. Pedersen, A. Mehta, H. You, K.A. Stoerzinger, Z. Feng, H.A. Hansen, H. Zhou, L. Giordano, J. Rossmeisl, T. Vegge, I. Chorkendorff, I.E.L. Stephens, and Y. Shao-Horn, Towards identifying the active sites on RuO_2(110) in catalyzing oxygen evolution, Energy & Environmental Science, 10, 2626-2637 December 2017.
11. Feng, S., M. Chen, L. Giordano, M. Huang, W. Zhang, C.V. Amanchukwu, R. Anandakathir, Y. Shao-Horn, and J.A. Johnson, Mapping a stable solvent structure landscape for aprotic Li–air battery organic electrolytes, Journal of Materials Chemistry A, 5, 23987-23998 December 2017.
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reaction mechanisms for perovskite oxides, Energy & Environmental Science, 10, 2190-2200 October 2017.
14. Elias, J.S., K.A. Stoerzinger, W.T. Hong, M. Risch, L. Giordano, A.N. Mansour, Y. Shao-Horn, In Situ Spectroscopy and Mechanistic Insights into CO Oxidation on Transition-Metal-Substituted Ceria Nanoparticles, ACS Catalysis, 7, 6843-6857 October 2017.
15. Tulodziecki, M., G.M. Leverick, C.V. Amanchukwu, Y. Katayama, D.G. Kwabi, F. Bardé, P.T. Hammond and Y. Shao-Horn, The role of iodide in the formation of lithium hydroxide in lithium-oxygen batteries, Energy & Environmental Science, 10, 1828-1842 August 2017.
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17. Risch, M., K. A. Stoerzinger, B. Han, T.Z. Regier, D. Peak, S. Y. Sayed, C. Wei, Z. Xu, and Y. Shao-Horn, Redox Processes of Manganese Oxide in Catalyzing Oxygen Evolution and Reduction: An in Situ Soft X-ray Absorption Spectroscopy Study, Journal of Physical Chemistry C, 121, 17682-17692 August 2017.
18. Bamgbopa, M.O., Y. Shao-Horn and S. Almheiri, The potential of non-aqueous redox flow batteries as fast-charging capable energy storage solutions: demonstration with an iron–chromium acetylacetonate chemistry, Journals of Materials Chemistry A, 5, 13457-13468 June 2017.
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20. Rajput, N.S., Y. Shao-Horn, X.-H. Li, G.-G. Kim, and M. Jouiad, Investigation of plasmon resonance in metal/dielectric nanocavities for high-efficiency photocatalytic device, Phys. Chem. Chem. Phys., 19, 16989-16999 May 2017.
21. Tatara, R., D.G. Kwabi, T.P. Batcho, M. Tulodziecki, K. Watanabe, H.-M. Kwon, M.L. Thomas, K. Ueno, C.V. Thompson, K. Dokko , Y. Shao-Horn, and M. Watanabe, Oxygen Reduction Reaction in Highly Concentrated Electrolyte Solutions of Lithium Bis(trifluoromethanesulfonyl)amide/Dimethyl Sulfoxide, The Journal of Physical Chemistry, 121, 9162-9172 May 2017.
22. Stoerzinger, K.A., R.R. Rao, X.R. Wang, W.T. Hong, C.M. Rouleau, and Y. Shao-Horn, The Role of Ru Redox in pH-Dependent Oxygen Evolution on Rutile Ruthenium Dioxide Surfaces, 2, 668-675 May 2017.
23. Grimaud, A., O. Diaz-morales, B.H. Han, W. T. Hong, Y.L. Lee, L. Giordano, K. A. Stoerzinger, M.T.M. Koper, Y. Shao-Horn, Activating lattice oxygen redox reactions in metal oxides to catalyze oxygen evolution, Nature Chemistry, 9, 457-465 May 2017.
24. Kornblum, L., D. Fenning, J. Faucher, J. Hwang, A. BONI, M.G. Han, D.M. Acosta, Y. Zhu, E. Altman, M. Lee, C. Ahn, F.J. Walker and Y. Shao-Horn, Solar Hydrogen Production Using Epitaxial $SrTiO_3$ on a GaAs Photovoltaic, Energy & Environmental Science, 2016, 10, 377-382 April 2017.
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26. Sheberla, D., J. C. Bachman, J. S. Elias, C-J. Sun, Y. Shao-Horn, and M. Dinca, Conductive MOF Electrodes for Stable Supercapacitors with High Areal Capacitance, Nature Materials, 16, 220-224 February 2017.
27. Morasch, R., D.G. Kwabi, M. Tulodziecki, M. Risch, S. Zhang, and Y. Shao-Horn, Insights into Electrochemical Oxidation of NaO2 in Na–O2 Batteries via Rotating Ring Disk and

Spectroscopic Measurements, ACS Applied Materials and Interfaces, 9, 4374-4381 February 2017.
28. Belova, A.I., D. Kwabi, L. Yashina, Y. Shao-Horn, and D. Itkis, On the Mechanism of Oxygen Reduction in Aprotic Li-Air Batteries: The Role of Carbon Electrode Surface Structure, Chemistry of Materials, 121, 1569-1577 January 2017.
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