

YANG SHAO-HORN

W.M. Keck Professor of Energy
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Professor Shao-Horn is the W.M. Keck Professor of Energy at the Massachusetts Institute of Technology (M.I.T.) and 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 teaches and conducts research in the area of surface science, catalysis/electrocatalysis, and design of materials and processes for electrochemical energy storage.

Professor Shao-Horn's research programs are centered on understanding the electronic structures of surfaces, with emphasis on metal oxides, searching for descriptors of catalytic activity, surface/interface reactivity and ion transport, and applying fundamental understanding to design materials for oxygen electrocatalysis, CO₂ reduction, ion intercalation and ion conductors, in electrochemical/photoelectrochemical energy conversion and storage, including lithium-ion, flow and metal-air batteries, proton exchange membrane and solid oxide fuel cells.

Professor Shao-Horn's programs include extensive experimental components including synthesis of well-defined surfaces and nanostructured materials, and investigation of processes at the surfaces/interfaces using electrochemical methods coupled with ex situ and in situ X-ray-based and electron-based spectroscopy. These experimental components are used in conjunction with Density Functional Theory computation efforts to develop new, physically based reaction mechanisms and design principles of materials.

Professor Shao-Horn has published 200+ archival journal papers (Thomson Reuters Highly Cited Researcher, Web of Science 3,300+ citations in 2015) and has advised 70+ M.S. and Ph.D. students and Postdoctoral Associates at MIT, now pursuing successful careers in industry including clean energy startups, chemical, automotive and energy industry, consulting, national research laboratories, and in academia including faculty positions at MIT, Georgia Tech and Cornell as well as academic positions in Europe and Asia.

Professor Shao-Horn has received several honors recognizing her teaching/mentoring and research contributions, including the Charles Tobias Young Investigator Award from the Electrochemical Society, the Tajima Prize from the International Society of Electrochemistry, Gail E. Kendall (1978) Professor of Mechanical Engineering, the Research Award by the International Battery Materials Association, Singapore Research Professorship and, most recently, Royal Society of Chemistry Fellow and AAAS Fellow. Professor Shao-Horn has been serving on the advisory/editorial boards of leading journals in energy science and physical chemistry including American Chemical Society Journal of Physical Chemistry, Royal Society of Chemistry Energy and Environmental Science and ChemElectroChem, and Cell Press Chem.

Representative Publications of Yang Shao-Horn

1. 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.
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9. 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±δ}/La_{1-x}Sr_xCoO_{3-δ} Heterostructured Thin Films, *Journal of Physical Chemistry Letters*, 5, 1027-1034 2014.
10. 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.
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Full Publications of Yang Shao-Horn

Professor Shao-Horn, together with her research group and collaborators, has published 200+ peer-reviewed archival journal publications and is a co-inventor on a number of issued and pending Patents. Professor Shao-Horn has advised 70+ M.S. and Ph.D. and postdoctoral researchers.

1. Johnson, C.S., M.F. Mansuetto, M.M. Thackeray, Y. Shao-Horn and S.A. Hackney, Stabilized α -MnO₂ Electrodes for Rechargeable 3 V Lithium Batteries, *Journal of the Electrochemical Society*, 144, 2279–2283 July 1997.
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