

# Transforming Energy Lecture

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## *Thin Film Solid State Ionics: Defects, Transport and Electrocatalytic Properties*

**1:00 PM, November 13, 2015**

Room 2108, Chemical & Nuclear Engineering Building  
University of Maryland, College Park

**Dr. Harry L. Tuller**

Professor of Ceramics and Electronic Materials,  
Massachusetts Institute of Technology



### Abstract

The field of *Solid State Ionics*, dealing with materials exhibiting significant ionic or mass transport under electrical or chemical potential gradients, is receiving a great deal of attention, given the needs for improved energy storage and conversion devices and robust environmental monitoring devices. We report on advances made in our laboratory in achieving improved insights into the defect, transport and electrocatalytic properties of films of interest in solid oxide fuel cell cathodes, membranes and automotive catalysts by taking advantage of controlled morphology and geometry of thin films including the use of oxide superlattices and the application of advanced in-situ analytical tools including impedance, optical and scanning tunneling spectroscopies and nano-indentation.

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### Biography

Harry L. Tuller is Professor of Ceramics and Electronic Materials; Department of Materials Science and Engineering and Head of the Crystal Physics and Electroceramics Laboratory at MIT.

He received B.S. and M.S. degrees in Electrical Engineering and Eng.Sc.D. in Solid State Science & Engineering from Columbia University, NY; served as Postdoctoral Research Associate; Physics, Technion, Israel, following which he joined the faculty at MIT.

His research focuses on defects, diffusion, and the electrical, electrochemical and optical properties of metal oxides with applications to sensors, fuel cells, photoelectrochemistry, thin film oxides, microphotonics, and MEMS devices. He has published over 425 articles, co-edited 15 books and was awarded 29 patents. He is Editor-in-Chief of the Journal of Electroceramics; Series Editor of Electronic Materials: Science and Technology published by Springer; and co-founder of Boston MicroSystems, a pioneer in silicon carbide-based MEMS technology and devices.



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