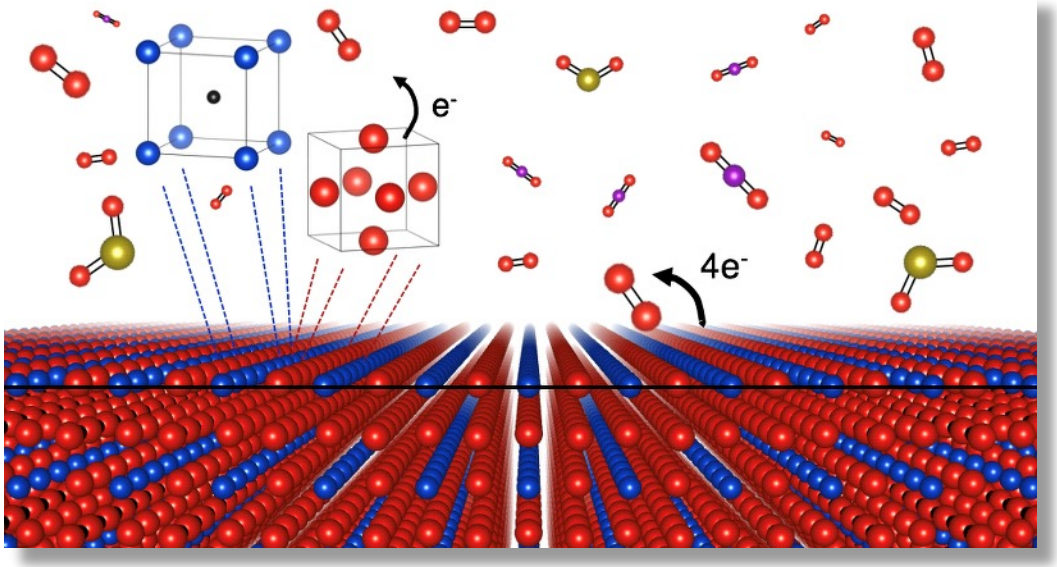
PHYSICS COLLOQUIUM SERIES - SPRING 2019

WHAT'S AT THE SURFACE?



During this talk, I will discuss the unique nature of catalyst surfaces in the context of fuel cells. I will share advanced electron microscopy and in situ synchrotron radiation experiments that probe the top few nanometers of the gas/solid interface to reveal chemical heterogeneity at the catalyst surface. Then, I will discuss the origins of catalytic degradation and introduce drop-in solutions for commercial applications that reduce degradation and improve catalytic activity.

Understanding and Engineering The Front Line of Electrocatalytic Activity

In the field of electrochemical energy conversion, high catalytic activity and stability carry tantamount importance for penetration of efficient, energy-conversion devices. Perovskite oxide catalysts are tunable, low-cost alternatives to precious metal catalysts for use in fuel cells, electrolyzers, and thermochemical fuel systems.

Despite being commercialized, large-scale adoption of solid oxide fuel cells has been hindered due to degradation of the perovskite cathodes carrying out the oxygen incorporation reaction. Degradation sources have been shown to originate both from gas phase contaminants in ambient air reacting with the electrode surface and from cation bulk-to-surface segregation and precipitation processes at the gas/solid interface.

Dr. Michael Machala `09

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FRIDAY - FEBRUARY 22 - 12:10 PM

Hayes Hall - Room 211/213

Lunch will be served from 11:50 - 12:10.