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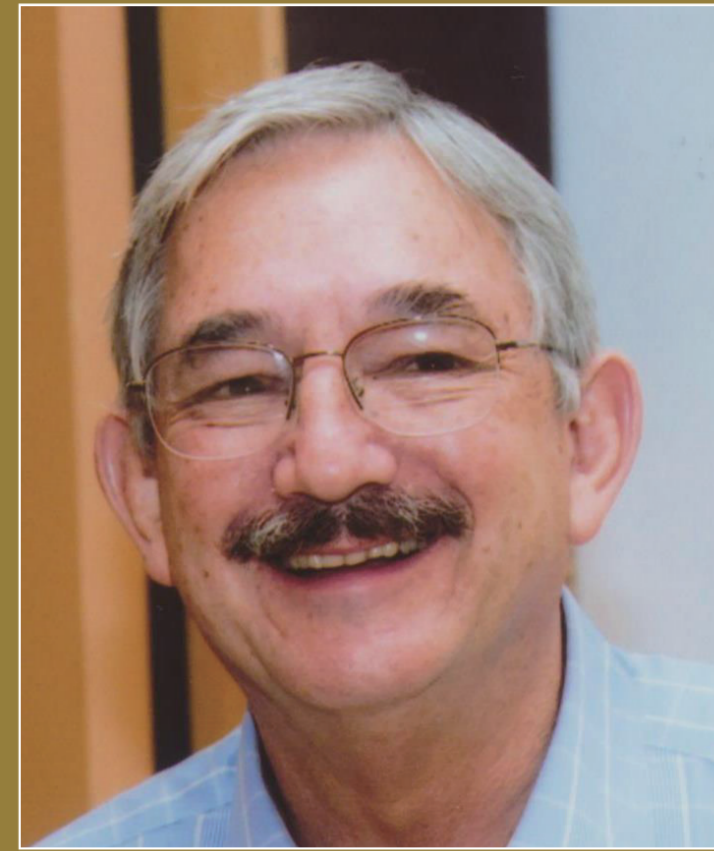
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City University Distinguished Lecture Series

Speaker

Professor David R. Clarke

*Extended Tarr Family Professor of Materials
John A. Paulson School of Engineering and Applied Sciences
Harvard University*



Progress Towards High-Temperature Thermoelectric Materials for Electric Power Generation

on

Thursday, 17 March 2016 at 4:30 pm

at

Connie Fan Multi-media Conference Room

4/F Cheng Yick-chi Building

City University of Hong Kong

Tat Chee Avenue, Kowloon

Abstract

To have an impact utilizing waste heat to generate electricity, thermoelectrics must be capable of operating at high temperatures for extended times and be made of earth-abundant elements. This raises severe scientific and technological challenges since present day thermoelectrics are made of scarce elements and attaining a high figure of merit, ZT , requires nanostructures that are intrinsically unstable at high temperatures. Furthermore, the physical parameters that determine ZT are contra-indicated so it's difficult to identify prospective new materials. Nevertheless, thermoelectric materials offer many attractive features for energy conversion: they are solid-state, have no moving parts requiring maintenance and so they should be able to operate for dozens of years, thereby enabling their cost to be recouped over many years of productive use. In this seminar, Professor Clarke will introduce two approaches to these challenges: the use of data mining to identify promising classes of materials, and the exploration of compounds that have a natural superlattice structure to produce a coarsening-resistant microstructure so that the thermoelectric properties will not degrade over time.

Biography

Professor David Clarke's interests in materials range from the fundamentals to the applied, from ceramics to metals to semiconductors and polymers. He has published over 450 papers in areas ranging from high-temperature materials, such as thermoelectrics and thermal barrier coatings, to dielectric elastomers devices to fundamentals of oxidation and device reliability. He also holds 11 patents and has several others submitted.

Professor Clarke is the inaugural holder of the Extended Tarr Family Professor of Materials and Applied Physics in the Harvard School of Engineering and Applied Sciences. He holds a PhD in Physics from the University of Cambridge, a B.Sc. in Applied Sciences from Sussex University and was awarded a ScD from the University of Cambridge. A member of the National Academy of Engineering since 1999, he is also a Fellow of both the American Physical Society and the American Ceramic Society, and received an Alexander von Humboldt Foundation Senior Scientist Award in 1993. He shared the 2008 Japanese NIMS Award for Recent Breakthroughs in Materials Science for Energy and Environment, is a Distinguished Life Member of the American Ceramic Society and was recently listed as author of one of the 11 best papers in the 110 years of publications on ceramics and glasses.

Online registration:

http://www.cityu.edu.hk/vprt/distinguished_lecture_series/upcoming.htm

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