学术活动

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清华大学材料科学与工程研究院《材料科学论坛》学术报告：Size effects of Materials Confined to Nanometer Dimensions including 2D Membranes, Metal Clusters, and Vesicles: Nanocalorimetry and NMR Studies

清华大学材料科学与工程研究院《材料科学论坛》

学术报告

报告题目：Size effects of Materials Confined to Nanometer Dimensions including 2D Membranes, Metal Clusters, Nanocalorimetry and NMR Studies

报告人：Prof. Leslie Allen (University of Illinois，Material Science Dept.)

报告时间：2018年10月29日（星期一）下午3:30

报告地点：清华大学逸夫技术科学楼A512

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报告摘要：

The nature of materials at nanometer size scales is fascinating and ubiquitous. In nanoscience, size-effects membranes (single/stacked), lipid-like vesicles (bioscience), magic number cluster formation, glass-transition melting point depression (Gibbs-Thompson), odd/even chain length artifacts, nucleation controlled phase-tra (nanoelectronics), etc. This talk discuses experimental small-size material studies using Nanocalorimetry, AFM, X more recently NMR. The studies follow the progressive and sometime abrupt changes in material properties duri incremental increase from 1-nm to bulk in several systems. Finally, I will discuss the future direction of our development of a "Local Atomic-level Thermodynamic Probe for Nanoscience of 2D Membranes" that co synthesis, NMR, Nanocalorimetry, and computational DFT Methods. NMR adds new possibilities for research at scale. While Nanocalorimetry yields average thermodynamic values at extremely small scales (one atomic lay melting), it has no depth perception – it can't reveal the underlying nature of the material at the atomic level. In chemical shift from NMR has the ability to distinguish one atom-type from another. However, it does not yield ir the local or composite thermal properties of the material. Combining these two techniques with the modelling con available with DFT computational machinery will potentially develop a new probe for material characterization at th size domain.

报告人简介：

Prof. Leslie Allen received his BS degree in mathematics (University of North Dakota, 1975), MS degree in phys University, New York, 1979), and PhD degree in materials science and engineering (Cornell University, 1990). H University of Illinois. He has authored Over 100 journal papers and 4 patents.

SYNERGISTIC ACTIVITIES:

Innovations in Undergraduate and Teaching Teaching: Awarded/rated 10 years - Top 10% Teachersin Engineering 2001, 2003, 2011-2013). Developed undergraduate senior Electronic Materials Laboratory that has been rated in th all Engineering classes for 10 years. With over 15 contact-hours a week, the class attracts the best students in the Most of them later go to top graduate schools and obtain NSF/DOD scholarships. A new experiment is developed typically coming from a problem in my research that is “simple” enough for them to solve in weeks, but deep stump us for months.

Development of Instrumentation Infrastructure Research Tools: Nanocalorimetry (NanoDSC) My group develop sensitive calorimeter device NanoDSC to date for material science research. In addition to serving on many NSF pa have also served NIH review panel specifically to review MEMS based “bio-calorimetry” devices. I have given ov (National/International) talks on the device and research using NanoDSC for nanoscale materials. My group has (and funded).

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