美国加州大学圣地亚哥分校 Jian Luo(骆建)教授讲学通知

应我校材料学院王玉金教授的邀请，美国加州大学圣地亚哥分校 Jian Luo（骆建）教授将于 2017 年 7 月 6-8 日来我校访问并作学术报告，欢迎全校师生参加。

报告人：**Jian Luo（骆建）**

报告题目：**Development of Interfacial "Phase" Diagrams to Decode the Materials Genome**

报告时间：**2017 年 7 月 7 日（星期五）上午 9：00-11:30**

报告地点：哈工大科学园 **C3** 栋特陶所 **4** 楼学术报告厅（**417** 房间）

报告摘要:

A piece of ice melts at 0 °C, but a nanometer-thick surface layer of the ice can melt at tens of degrees below zero. This phenomenon, known as "premelting," was first recognized by the physicist Michael Faraday. Materials scientists have discovered that interfaces in engineered materials can exhibit more complex phase-like behaviors at high temperatures, which can affect the fabrication and properties of a broad range of metallic alloys and ceramic materials. Specifically, recent studies of 2-D grain-boundary (GB) phases (also called "complexions") shed light on several long-standing mysteries in materials science, including the origins and atomic-level mechanisms of activated sintering and liquid metal embrittlement. Recently, we have also successfully stabilized nanocrystalline alloys (with grain sizes < ~100 nm) at high temperatures (>1000°C) using high-entropy GB complexions. Since bulk phase diagrams are one of the most useful tools for materials design, it is conceived that interfacial "phase" diagrams can be developed as a useful materials science tool, in support of the Materials Genome Initiative.

If time permits, I will also very briefly discuss our other on-going studies on **(a)** utilizing spontaneously-formed 2-D surface phases to improve the performance of various functional materials for energy-related applications, including batteries, supercapacitors, photocatalysts, and oxygen-ion conductors; **(b)** understanding the mechanisms of flash sintering, where we have developed a model to predict the onset flash temperature with a precision of ≤ ±6 °C and achieved, *e.g.*, the sintering of ZnO ($T_m \approx$ 1975 °C) to >97% density at an extremely low furnace temperature of < 120 °C (or even in a room-temperature environment without any external heating in a most recent unpublished work) in 30 seconds; and **(c)** fabricating a new class of high-entropy, ultra-high-temperature ceramics, including $(Hf_{0.2}Zr_{0.2}Ta_{0.2}Nb_{0.2}Ti_{0.2})B_2$ and other metal diborides with a unique quasi-2D high-entropy structure, as well as several other classes of other high-entropy structural and functional ceramics.

报告人简介

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Jian Luo graduated from Tsinghua University with dual Bachelor's degrees. After receiving his Ph.D. degree from M.I.T. in 2001, Luo worked in the industry for more than two years with Lucent Technologies Bell Laboratories and OFS/Fitel. In 2003, he joined the Clemson faculty, where he served as an Assistant/Associate/Full Professor of Materials Science and Engineering. In 2013, he moved to UCSD as a Professor of NanoEngineering and Professor of Materials Science and Engineering. He received a National Science Foundation CAREER award in 2005 (from the Ceramics program) and an Air Force Office of Scientific Research Young Investigator award in 2007 (from the Metallic Materials program). Luo was named as a Vannevar Bush (National Security Science and Engineering) Faculty Fellow in 2014 and elected as a Fellow of the American Ceramic Society in 2016. He authored/co-authored >90 articles in refereed journals, including Science, Nature Communication, Phys. Rev. Lett., and Acta Materialia, etc.

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