THE MATERIALS SCIENCE AND ENGINEERING DEPARTMENT COLLOQUIUM SERIES PRESENTS:

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Advanced Applications of TEM in Engineering Alloys

Because of the superior creep and oxidation resistance at high temperature, superalloys have a continued important role in high temperature materials applications such as gas turbines and power plants. As a microelement, boron (B) is generally added into almost all the commercial superalloys for strengthening the grain boundaries. Even for the single crystal superalloys, many low-angle grain boundaries still exist, where addition of suitable B is also very helpful to achieve good overall properties. B tends to segregate at the boundaries/interfaces as the solution state. Additionally, B also tends to form various kinds of boride (e.g. M3B2, M2B, M5B3). As for the detailed microstructural features of these borides, there is limited knowledge in available literatures. Accurate understanding of these microstructural features is very helpful to discuss the structure-property relationship. Thus, in the past 10 years, we performed a systematical study on above borides by means of various microscopy methods based on the aberration corrected TEM. In this talk, I will introduce the advanced applications of TEM methods on revealing the atomic scale structural and chemical features of these borides.

Dr. Xiaobing Hu is a research assistant professor in the Department of Materials Sciences and Engineering at Northwestern University. He received his B.S. in Materials Sciences and Engineering from Central South University in China in 2009. He received his Ph.D. from Institute of Metal Research, Chinese Academy of Sciences (IMR, CAS) in 2015 for studies of electron microscopy and its advanced applications in superalloys supervised by Prof. Xiuliang Ma. After that, he worked as a postdoc researcher supervised by Prof. Yuichi Ikuhara at Japan Fine Ceramic Center (JFCC). Then, he joined Brookhaven National Laboratory (BNL) as a research associate supervised by Dr. Yimei Zhu. Xiaobing joined NUANCE center in August 2018. His interest is the advanced applications of various TEM methods in materials science. During the past 10 years, he has been focusing the research work on various engineering alloys and energy storage materials.

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