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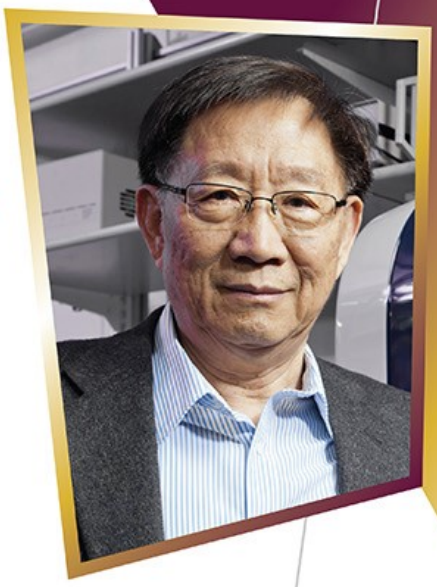

Alloy Design of Structural Materials from Simple Disordered to Complex Ordered Material Systems

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Time： 3:00pm – 4:30pm

Please visit the HKIAS website at www.hkias.cityu.edu.hk to register for this online lecture via Zoom.

Abstract

Structural materials can be roughly divided into two major categories: one with disordered atomic structures and the other with ordered atomic structures (intermetallic materials). Structural materials with disordered atomic structures generally show a good strength and ductility at ambient and low temperatures; however, they are usually lack of sufficient strengths at elevated temperatures. On the other hand, ordered intermetallic materials have attractive strengths at elevated temperatures but they generally suffer from ductility losses at ambient and low temperatures. Our studies have revealed that the ductility loss is essentially due to limited slip systems or brittle grain boundaries. Both basic and applied researches have thus devoted to the ductility enhancement of ordered and disordered structural materials. Our studies reveal that most brittleness problems for intermetallic alloys can be resolved by the activation of slip systems or the enhancement of grain-boundary cohesive strengths by selected alloy dopants. Our efforts have led to the development of new structural materials based on ordered intermetallic materials for high-temperature applications.

Biography

Professor C.T. Liu is a member of National Academy of Engineering (NAE), USA, a foreign member of Chinese Academy of Engineering, and an academician of Academia Sinica Taiwan. He is currently a University Distinguished Professor of City University of Hong Kong. He served as a Professor and Distinguished Research Professor at University of Tennessee between 2005 and 2009, and a Distinguished Professor at Auburn University, USA between 2005 and 2010. He is a world leader in the field of intermetallic and metallic materials. He has done pioneer work on mechanistically understanding the brittle fracture in intermetallic alloys and intergranular fracture in noble refractory alloys, correlation of atomic structures of bulk metallic glasses (BMGs) with their unique mechanical properties, and hardening of ferritic steels with various nanoparticles. He has published more than 500 journal papers and been granted 29 US patents. In 1995, ISI had identified him as one of top five highly-cited authors in the materials field. Professor Liu has received numerous honours and awards, including Acta Metallurgica Gold Medal Award, the E.O. Lawrence Award (a US President award) from USDOE, Brown Engineering Alumni Award from Brown University, the first Henry J. Albert Award from IPMI, Fellow Awards from five professional societies – Japan Institute of Metals, the World Technology Network, TMS, ASM, and IPMI, four I•R 100 Competition Awards from Industrial Magazine USA. He was an editor and the Chief Editor of the International Journal of Intermetallics for almost 20 years.

All are welcome

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