

In-situ transmission electron microscope on deformation process of nano-sized crystals

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Abstract

This talk will be the in-situ mechanics for studying the mechanical behavior at atomistic scale for nanometer-sized single element metallic glass and crystal BCC metals. The experimental molecular dynamics with the in-situ high resolution transmission electron microscope is going to open a new approach to directly observe atomic-scaled deformation mechanisms with in-situ mechanics. I will cover the high stress induced lattice disturbance, dislocation dipole nucleation and competition between slip and twinning in the deformation process of nano-sized body center cubic metals [1] and deformation in single elemental metallic glasses [2].

References

1. Jiangwei Wang, Zhi Zeng, Christopher R. Weinberger, Ze Zhang, Ting Zhu and Scott X. Mao, *In Situ Atomic-Scale Observation of Twinning Dominated Deformation in Nanoscale Body-Centred Cubic Tungsten*, *Nature Materials*, doi:10.1038/nmat4228, March 2015.
2. Li Zhong, Jiangwei Wang, Hongwei Sheng, Ze Zhang, and Scott X. Mao, *Formation of monatomic metallic glasses through ultrafast liquid quenching*, *Nature*, 2014, Vol.512, 177.

Biography of Presenting Author



Scott Mao currently is John Swenson endowed professor in the Department of mechanical Engineering and Materials Science at University of Pittsburgh. He is an internationally recognized researcher and educator in area of deformation physics of nanostructured materials, metallic glasses and intermetallics with in-situ transmission electron microscope. He has 197+ peer-reviewed journal publications including 25 Nature, Science, and Nature-series articles, Science advances, receiving 15,445+ total citations with H-index of 63, and has been invited for over one hundred times as keynote, plenary or invited speakers in well-known national/international conferences in ASME, MRS, TMS and SAE. He was MIT post-doctor fellow in 1988, and has been awarded Esso Research Excellence Award (1991), Leighton E. & Mary N. Orr Fellow (2000), William Kepler Whiteford Endowed Professor (2005), University Chancellor's Distinguished Research Award (2006), John Swanson Endowed Professor (2019), APS fellow (2020) and elected fellow of Canadian Academy of Engineering (2020).

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