Materials Science & Engineering Seminar Series

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presents

Materials Challenges in Structural Materials and the Role of Transmission Electron Microscopy

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ABSTRACT:
Most structural materials, like steel, aluminum, titanium and nickel-based superalloys have been manufactured for decades if not centuries. Despite the great advances and developments, significant materials science questions remain unanswered to date. This presentation aims to discuss and address some of the current challenges comprising a range from applied to fundamental topics and describe how Transmission Electron Microscopy can be utilized to assist and advance current understanding to enable future product and manufacturing process development. The focus will lie on Aluminum, Titanium alloys and Titanium Aluminides. Some of the presented work was conducted utilizing facilities, especially transmission electron microscopes at CMU.

BIOGRAPHY :
Born in Vienna March 26th, 1973. Received a master's degree in physics from the University of Vienna Austria in 2002, and a Ph.D. in Materials Science and Engineering from the University of Pittsburgh in 2007. Worked as research associate at the University of Pittsburgh and Carnegie Mellon University. The academic project work was mainly focused on characterization of microstructure / property relationships of materials for the magnetic recording industry (FePd, FePt and MnAl), plasticity of nanocrystalline materials, phase transformations and deformation in structural materials such as Al – alloys and TiAl, and rapid solidification (25 journal publications). Since 2014 employed by Alcoa/Arconic as principal transmission electron microscopist. Additionally, led high strain rate forming efforts of Al alloys, assisted traditional Al, Ti and TiAl alloy product and processing development. Developed a highly printable Al alloy for high temperature applications for additive manufacturing. Was awarded time at the high energy X-ray source at Cornell to conduct in situ experimentation. Established DFT capabilities at Alcoa/Arconic and won a $300K DOE hpc4mfg award to use the Oak Ridge supercomputer Titan for alloy exploration efforts. To date work has led to about ~ 15 - 20 patent applications.

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