FZU
Institute of Physics of the Czech Academy of Sciences

SEMINAR

Department of Functional Materials

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The main lecture hall of the FZU building, Na Slovance 1999/2, Prague 8

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Insights on Processing and Characterization of NiTi-based High Temperature Shape Memory Alloys

In this presentation, research from Dr. Young's X lab at the University of North Texas (UNT) will be discussed with a focus on thermo-mechanical processing and advanced characterization of NiTi-based high temperature shape memory alloys (HTSMAs). A brief discussion of SMAs and HTSMAs, their applications, their characteristic properties, their current challenges, and techniques such as synchrotron radiation X-ray diffraction (SR-XRD) to address these challenges will be presented. Within this context, one such project will be presented on HTSMAs as a material for use as actuation devices. The objectives of this project are to develop a cost-effective HTSMA, specifically NiTi-Hf and NiTi-Zr alloys, and determine processing conditions to produce alloys into useable geometries (tubes, plates, wires, and powders) through investigation of oxidation and precipitation characteristics of these alloys. Advanced characterization techniques are used to examine these alloys, where SR-XRD on HTSMAs in various processing conditions during in situ thermal cycling is coupled with scanning electron microscopy (SEM) and transmission electron microscopy (TEM) results to reveal successful thermo-mechanical processing routes of these HTSMAs.