MM 52: HV Seidman

Time: Thursday 15:00–15:30 Location: H 0107

Invited Talk MM 52.1 Thu 15:00 H 0107

A renaissance in atom-probe tomography for the study of all materials — •David Seidman — Northwestern University, Evanston, Illinois U.S.A.

Atom-probe tomography (APT) is in the midst of a dynamic renaissance because of the of well-engineered instruments, which are robust and ergonomic and capable of collecting large data sets, hundreds of millions of atoms, in short time periods. And additionally the use of data analysis software programs, which are both robust and ergonomic, have dramatically improved the capabilities of APT. The use of picosecond ultraviolet (UV) or green lasers permits one to dissect specimens on an atom-by-atom and atomic-plane by atomic-plane basis at a pulse repetition rate of 1000 kHz. For example, APT is employed to study atomic-scale clustering, the genesis of second-phases, and the microstructural defects that control a metallic alloy's high-temperature mechanical properties. This information provides a detailed understanding on an atomic-scale of the origins of ageing, strength, creep, fracture toughness, corrosion, and irradiation resistance. APT is used to study thin films and multilayers: enabling us to understand them and permits further optimization of, e.g., electronic devices based on thin-films. Laser-assisted APT permits detailed atomic-scale studies of metal-silicide contact formation (silicidation reactions) and phase control, silicon field-effect transistors, and silicon, germanium and GaN nanowires. APT is also used to study organic/inorganic interfaces formed as a result of biomineralization