N O R T H W E S T E R N

U N I V E R S I T Y

ROBERT R. McCORMICK SCHOOL OF ENGINEERING AND APPLIED SCIENCE

David N. Seidman, Ph.D.
Walter P. Murphy Professor
Materials Science and Engineering
Founding Director, Northwestern University Center for Atom-Probe Tomography (NUCAPT)

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Dear Sir or Madam:

I have a large and active research group, formerly at Cornell University and presently at Northwestern University since September 1, 1985, and have been utilizing field-ion microscopes, atom-probe microscopes, and atom-probe tomographs as a principal research instrument for over 35 years. And I have been aware of Dr. Thomas Kelly's efforts, since 1998, to improve dramatically several key performance characteristics of atom-probe tomographs. And at the outset I want to state that he and his colleagues have succeeded at developing an instrument that is beyond my wildest imagination. They have produced a tool that is truly revolutionary and leaves the only other atom-probe tomograph on the market place in a distant second place. The three-dimensional (3-D) local-electrode atom-probe (LEAP) tomograph that has been developed by Imago Scientific Instruments is a superbly engineered instrument that has delivered more than was initially promised and continues to improve steadily with time. I have had an Imago 3-D LEAP tomograph in my laboratory at Northwestern University since mid-December 2004 and hence can talk about its performance in a very knowledge and detailed way.

In early November 2002, I visited Imago's facilities in Madison, Wisconsin along with two Northwestern University colleagues and our own specimens. And we ran model nickel-base (Ni-Al-Cr) superalloy specimens on Imago's atom-probe microscope, the 3-D LEAP tomograph – an alpha-version. I was extremely impressed by the Imago's 3-D LEAP tomograph and its performance at the end of my one-day visit. In two hours we collected upwards of 55 million atoms from a single specimen, with out pushing the instruments, as compared to about 220,000 atoms in the same period of time on the instrument I then had in my laboratory at Northwestern University. The increased speed and field-of-view allowed me to obtain outstanding statistically significant data on this model alloy, which simply could not have been obtained with the atom-probe tomograph I then had at Northwestern University at that time; we long ago ceased using

COOK HALL
2220 CAMPUS DRIVE EVANSTON
ILLINOIS 60208-3108 U.S.A.
Tel:1- 847-491-4391 Fax: 1-847-491.7820 e-mail: d-seidman@northwestern.edu **Home page: http://nucapt.northwestern.edu**

this instrument because it is essentially outdated. A little later one of my Ph.D. students returned to Imago with TiAl specimens containing metal carbide precipitates and obtained a data set of over 14 millions in a few hours, which permitted us to study this alloy in manner that was not possible with my old instrument. Therefore, Imago's 3-D LEAP tomograph fundamentally changed not only atom-probe tomography, but it also changed research on all metallic alloys as well, as it permitted me to examine alloys with small number-densities of nanoscale phenomena of interest and to obtain statistically significant data in relatively short periods of time. Hence, the problem shifted from collecting a sufficient amount of data that is statistically significant to the issue of analyzing the vast quantities of data obtained. Imago has also addressed the latter problem through the continuous development of IVAS, which is an impressive code for analyzing 3-D LEAP tomographic data that continues to improve with time thanks to the efforts of their software staff.

During the four plus years I have had a 3-D LEAP tomograph in my laboratory it has been used for performing research on a wide range of materials, metals, semiconductors, and oxides, and a colleague of mine is beginning to use it on biominerals. The researchers who use the 3-D LEAP tomograph are not only my Ph.D. and postdoctoral students but also the Ph.D. students of other faculty members in the Departments of Materials Science and Engineering, Mechanical Engineering, and Chemistry at Northwestern. Additionally, we are performing work for professors at other universities as well as industrial companies.

Imago also provides excellent service, which implies that there is precious little down time of the instrument.

I wish Imago Scientific Instruments continued success in their endeavors to further develop the 3-D LEAP tomograph, as it is a revolutionary instrument that has and will continue to revolutionize the field of materials science and engineering. Please feel free to contact me if you have questions.

Sincerely yours,

David N. Seidman, Ph.D.
Walter P. Murphy Professor
Materials Science and Engineering
Founding Director, Northwestern University Center for Atom-Probe Tomography