From the Editor

Atom Probe is 50 Years Old

The atom probe can identify the positions and elemental identities of individual atoms within a solid specimen. This extraordinary feat was achieved for the first time fifty years ago, only a dozen years after the first-ever image of single atoms was obtained in 1955. Both of these innovations took place in the laboratory of Erwin Müller at the Pennsylvania State University. Nice work. But it earned no Nobel Prize, which in retrospect seems like a serious oversight.

In the early twentieth century, doubtless some scientists asked themselves: if light microscopy was limited by the wavelength of light, was atomic resolution possible? And was it really necessary for discoveries? Chemists from Lavoisier to Pauling created the discipline of chemistry without the need to see atoms. Yet one of the driving forces for the development of the electron microscope was to utilize a medium with a wavelength much smaller than that of light in order to pursue atomic resolution. This goal has remained central to the development of several microscopy methods.

Tom Kelly and John Panitz, a co-inventor of the atom probe, provided the feature article in this issue. It describes the development of the atom probe and indicates that the quest for atomic resolution played a role in both field ion microscopy and the atom probe. Today's atom probes can reveal atomic details that in many cases cannot be obtained by any other method. It is especially useful in metallurgical and microelectronics research.

Today we can image atoms or atomic columns in solids by transmission electron microscopy and scanning probe microscopy, as well as with Müller's field ion microscopy. Some might say that atomic imaging and atom-by-atom analysis just confirms what we have learned from other more indirect methods. I tend to believe, however, that this important capability eventually will yield a great discovery when the right problem presents itself and when researchers devise a clever experiment to solve it.

We will celebrate the 50th anniversary of the invention of the atom probe at the annual Microscopy & Microanalysis meeting August 6–10, 2017, in St. Louis, Missouri. At this meeting, John Panitz will give a special lecture about the development of the atom probe.

Charles Lyman
Editor-in-Chief

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