Guest Editorial

Optical particle measurement

James D. Trolinger
Spectron Development Laboratories, Inc.
3303 Harbor Boulevard, Suite G-3
Costa Mesa, California 92626

Many tend to underestimate the extent of the science of particle sizing. Every field of science and virtually all industries encounter critical phases where particles become a part of a product or by-product.

In recent years the increased need to understand and quantify basic processes ranging from research to heavy industry has placed great demands on particle measuring instruments. Many companies have emerged to fulfill these needs with state-of-the art methods. New optics technology has opened the way to provide measurements that could not be made a few years ago. But the demands of science and industry seem to grow faster than the measurement technology.

On the one hand, industry needs usually call for simple, rugged, inexpensive instrumentation, while research requires more accuracy, higher speed, wider range, better sensitivity, and versatility. The search goes on to find the one technique in which all of the above features can be included.

In our choice of articles for this special feature we have attempted to illustrate the broad field of particle sizing, giving examples of applications in both science and heavy industry. First, the article by Hirleman serves as a summary and introduction to single particle counters, and provides an excellent bibliography for particle sizing. In his attempt to cover the details of the field, his original article was nearly twice as long. Fortunately, the requirement to reduce length has not eliminated the article's useful illustration of the many facets of particle sizing technology.

The article by Muly and Frock illustrates progress in industrial systems. A number of companies providing this class of instrumentation have found the necessary compromises to make the instruments useful in industry. As illustrated here, the basic technique itself is only a part of the instrument. Interfacing to industry is an equally important requirement.

The article by Lieberman illustrates the continuing need for checking and qualifying optical instruments for application. In general, optical techniques are much more complex than they first appear. We find the classical example of the frustration of obtaining as many different measurements as there are instruments. Particle sizing scientists must search for understanding of the relationship between their different instruments and be responsible for an acceptable explanation.

Houser describes a variety of applications largely applied to research which has taken his group into many different environments in the fields of meteorology, agriculture, energy, and environment. This article, as well as that by Muly and Frock, illustrates the use of microcomputers to automate otherwise extremely complicated technology providing "smart" instruments for particle sizing.