vent in an electron transfer reaction; this provides a good introduction to the subject at a graduate level.

Chemical kinetics is a hot topic now for two reasons: Fundamental theory is poised to make critical contributions, and several application areas involving combustion, catalysis, atmospheric processes and environmental concerns are all currently timely. Thus there is a need for modern texts. I think an instructor or student considering this book should compare it to some classic books of the past, such as those by Harold Johnston (*Gas Phase Reaction Rate Theory*, Ronald Press, 1966), by Ralph Weston and Harold Schwarz (*Chemical Kinetics*, Prentice-Hall, 1972), by Evgeny E. Nikitin (*Theory of Elementary Atomic and Molecular Processes in Gases*, Oxford University Press, 1974) or by Ian Smith (*Kinetics and Dynamics of Elementary Gas Reactions*, Butterworths, 1980). Those books cover similar topics but in a more complete fashion, and I recommend them all strongly. The fundamentals they cover will never be out of date, although, of course, post-1980 developments are lacking. The third edition of Keith Laidler's *Chemical Kinetics* (Harper & Row, 1987) is a more recent attempt at comprehensive coverage, and it does include some of the more modern developments.

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Photothermal Spectroscopy Methods for Chemical Analysis

Stephen E. Bialkowski
Wiley, New York, 1996. 584 pp. $89.95 hc ISBN 0-471-57467-8

Photothermal spectroscopy is unique in its ability to measure optical absorption coefficients and absorbances. Its importance in the analytical sciences cannot be overstated. In my 20 years of involvement in this field and its broader offshoots, I have always felt the need for a treatise that deals with photothermal spectroscopy's broad underpinnings, an imperative in a field that, unlike many other spectroscopic techniques, draws from disparate disciplines, not all of them housed within the same university department.

Stephen Bialkowski's *Photothermal Spectroscopy Methods for Spectral Analysis* seems to be precisely that treatise. The book is at the upper undergraduate and graduate level, and it could be used as the text in a course on photothermal spectroscopy. It may also be a real companion to the working scientist in this field and a valuable springboard for those intending to enter photothermal spectroscopy. Bialkowski goes into the major disciplines that make up photothermal spectroscopy and succeeds in thoroughly familiarizing the reader with the basic physics, chemistry and engineering behind each topic: absorption, energy transfer and excited-state relaxation; fluid mechanics and engineering hydrodynamics; electromagnetic theory of optical fields, Fourier optics and beam propagation theory; and, finally, conduction heat transfer.

To be sure, these topics can be found in upper undergraduate- and graduate-level books in the various disciplines. This book's major contribution is its success in giving rather detailed mathematical presentations (some of them refreshingly novel) of what the author thinks is needed to carry the reader through the research-level descriptions of photothermal spectroscopy.

Bialkowski is definitely among the leaders in photothermal spectroscopy, having helped make major contributions in the instrumentation and measurement-science domain of ultrasensitive detection in analytical chemistry. This book stands alone among the dozen or so existing books on photoacoustic and photothermal phenomena in that Bialkowski actually worked on the research results of his colleagues and has placed them in the proper perspective within the array of photothermal spectroscopic techniques. The tables in chapter 8, on comparative applications of photothermal spectroscopy, are unique and will withstand the passage of time. The prospects of the book are those of a "classic."

One of the highlights of this book for me was its detailed discussions of photothermal data processing, analysis, signal-to-noise ratios and instrumentation. Bialkowski's talents as an experimentalist are clearly shown in those crucial sections, which are usually glossed over by workers in the field.

I found one shortcoming in this otherwise splendid book: Despite its sometimes excessive detail, it essentially neglects photothermal spectroscopic techniques other than those that deal with the laser thermal lens, photothermal deflection, refraction, diffraction or interferometry. In recent years, important advances have been made in, for instance, infrared photothermal radiometric spectroscopy, photopyroelectric spectroscopy and thermal dynamic gratings with applications in the analytical sciences. A slight redistribution of the material might easily have accommodated those novel areas of research and growth. All in all, this does not detract from the considerable strengths of the volume. I strongly recommend it to both students and professionals.

Andreas Mandelis
University of Toronto
Toronto, Canada

New Books

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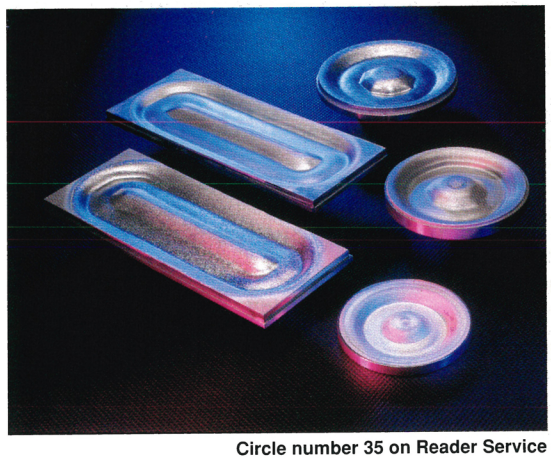

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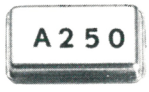

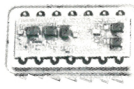

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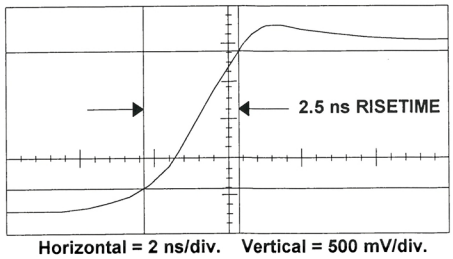

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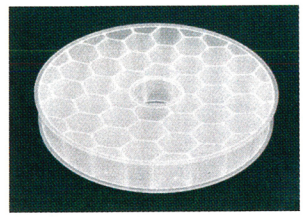

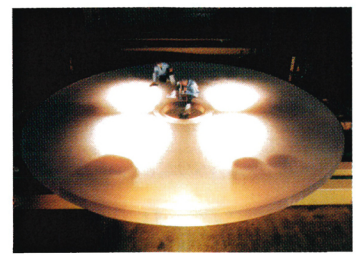

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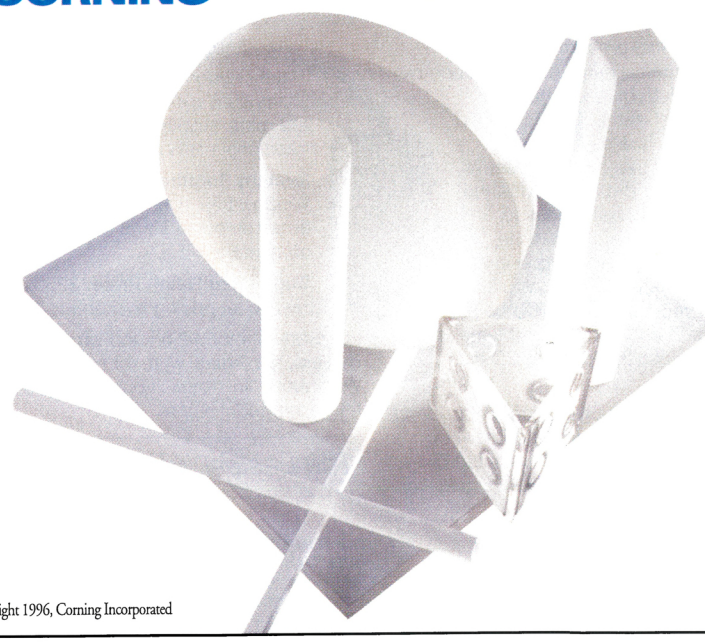

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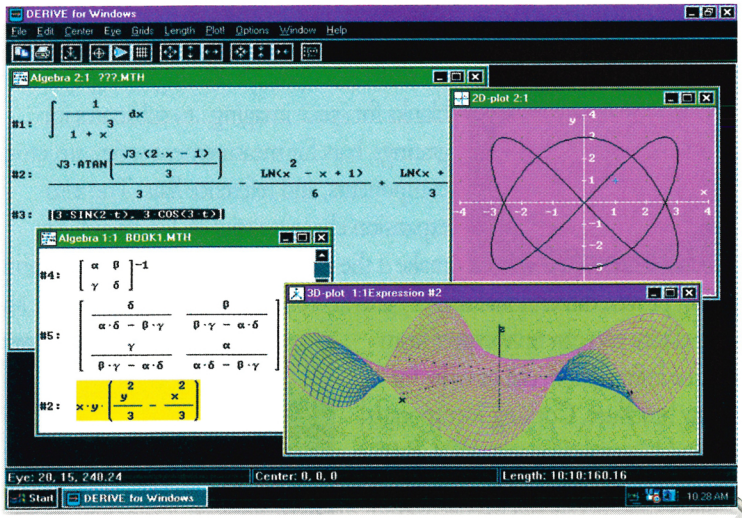

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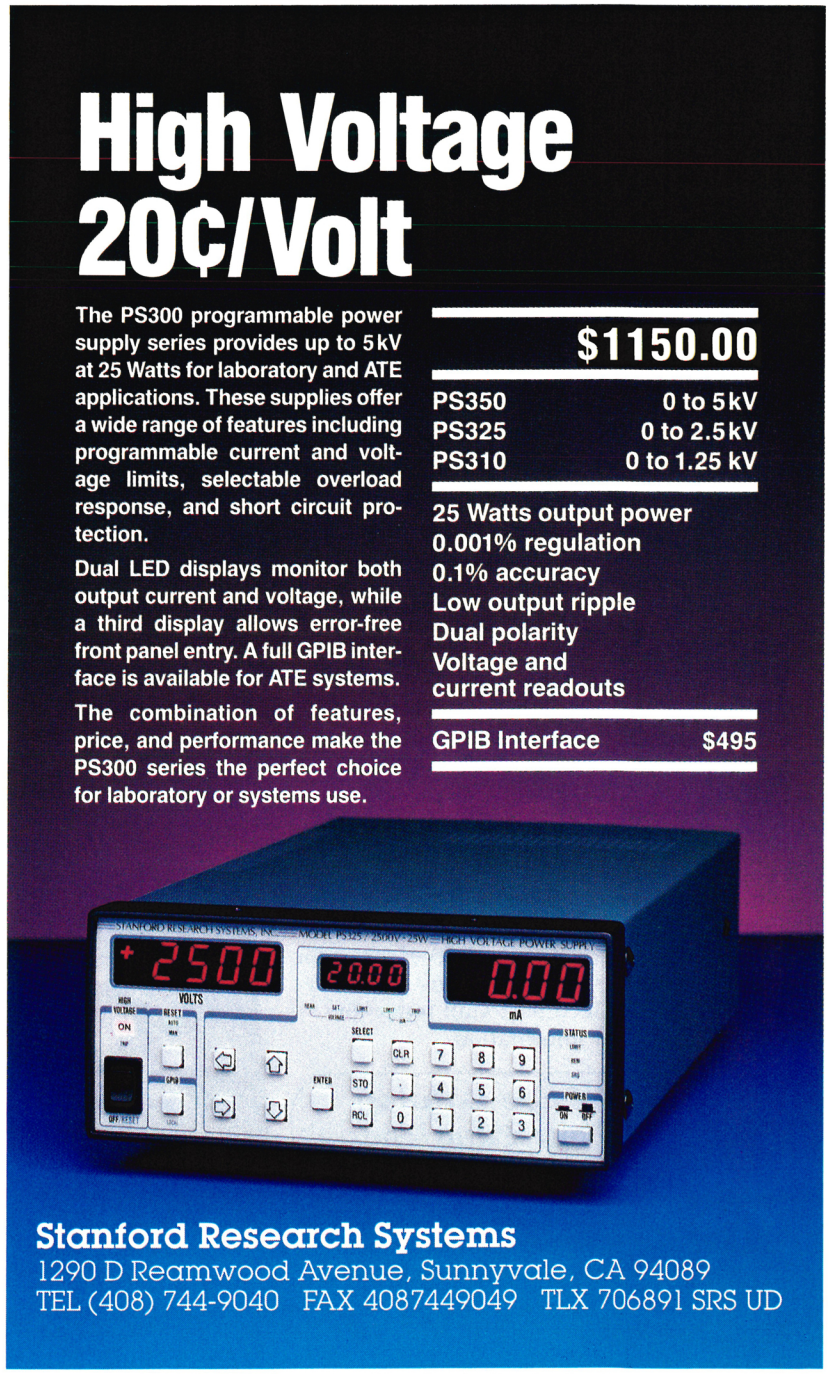

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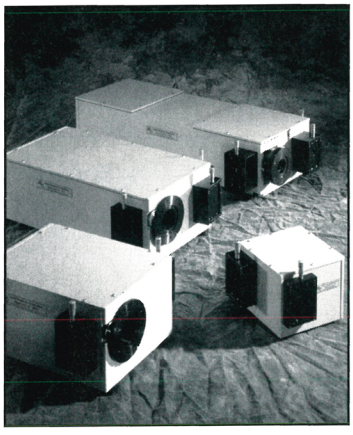

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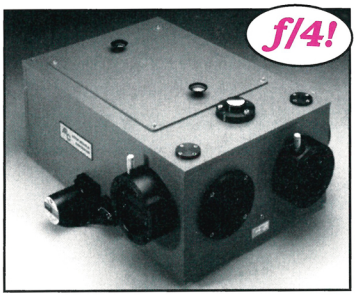

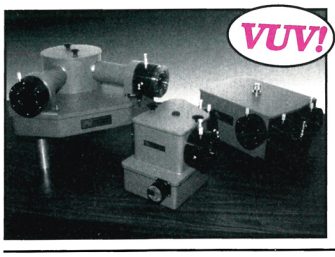

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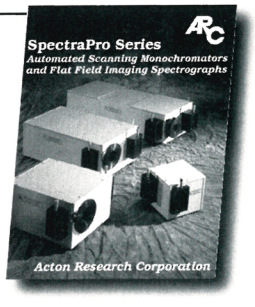

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