EDITOR'S FOREWORD

Spectral analysis of gas mixtures is a relatively recent addition to generally available analytical techniques, and presents its own peculiarities, as well as some specific difficulties. In emission analysis, the main difficulties are connected with the excitation of spectral lines in a low-pressure gas discharge plasma and the inevitable evolution of gases (as well as their absorption) by the discharge tube walls. This has a negative effect on analytical accuracy. Nevertheless, the composition of gaseous mixtures can be successfully determined by spectral methods, and problems are now solved simply and rapidly by such techniques. Thus, spectral analysis is used for quality control of inert gases; this analysis is also used to test gases given off by various processes, to test air, etc.

Analysis of gas mixtures is less sensitive than that of metals. At best, the limit of detection is not lower than $10^{-4} \%$. Increasing this sensitivity is a difficult problem, which will be solved eventually. On the other hand, the absolute limit of detection of this analysis may be higher in the case of gases ($\sim 10^{-10}$ g) than for metals. The spectra of most gases show rather widely spaced lines, or very distinct molecular bands. Because of this,
fast-response photoelectric gas analyzers using light filters can be designed. In these, the dispersing system can be eliminated. Such equipment should prove useful in solving numerous analytical problems.

In spectral gas analysis, generally applicable techniques cannot be devised as readily as in cases where metals or alloys are analyzed. The problems involved for the most part require specific solutions. Consequently, there is a much-felt need for a pertinent manual—all the more so in view of the paucity of available literature on the subject. "Spectral Analysis of Gas Mixtures," by O. P. Bochkova and E. Ya. Schreider, published in 1955, has been out of print for some time. Thus a new edition was in order.

In the eight years that have elapsed since the date of the first edition, an impressive number of papers on spectral gas analysis were published both in the Soviet Union and abroad. New techniques have been developed. The range of problems that can be solved has been broadened. This called for a revision of the book, with the incorporation of recent material. At the same time the authors, not wishing to expand the work too far, deleted the general discussion of spectroscopic and spectral-analytical techniques, since this is a topic treated in generally available books.

The new edition offers a more extensive description of photoelectric procedures, which are now widely used by spectroscopists. Some recently developed quantitative methods of fast gas analysis are described. As before, the book is concerned primarily with emission analysis. To render it more comprehensive, however, Chapter VI on absorption analysis was materially extended to include spectroscopic procedures based on absorption in the ultraviolet and infrared regions of the spectrum, the optico-acoustic method, etc.
The appended tables help in selecting specific conditions for analyzing the most commonly used mixtures. Reproductions of spectrograms are given for most of the gases dealt with in practice. Ample references will further aid the researcher in solving problems of a more specific nature.

S. E. Frisch