

<<分析化学手册>>

图书基本信息

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## 前言

The growth of modern technology has confronted the analytical chemist with a host of new and increasingly complex materials, has called on that person to provide information about constituents previously unrecognized or ignored, and has posed more stringent demands for greater sensitivity, reliability, and speed. On the other hand, developments in instrumentation and the research of colleagues in allied fields have provided the analyst with new techniques, instruments, procedures, and reagents for dealing with these problems. This very expansion of equipment, reagents, and methodology has, however, greatly complicated the task of the chemist searching for the best way of attacking a new or unfamiliar sample. This handbook is intended to provide analytical chemists and their colleagues in related sciences with concise and convenient summaries of the fundamental data and the practical procedures that are most important and most useful among the conventional wet and instrumental methods in modern analytical chemistry. All this is presented in a convenient desk-size guide.

Without ready access to the data that describe the behaviors of the various substances present toward different techniques, it is all too easy for the special peculiarity of the one most suitable technique to escape notice. One of the hardest problems in analytical work is in choosing the right technique to solve a problem. With this handbook the reader will have a handy reference all in one place for analytical techniques. The handbook should be especially helpful in those laboratories which may not have developed a wide variety of in-house analytical methods.

Extensive application tables contain just enough information to enable a reader to reach a judgement call about the possible applicability and range or sensitivity of a method plus references that will supply more detailed directions and discussion of the method. Intercomparison of techniques within a general topical area or between one or several topical areas are provided to enable the user to reach a decision on choice of a method. Factors entering into this decision might be cost, time of analysis, sensitivity, reproducibility, and expertise required of the operator. As an aid to understanding the parameters involved in a technique, many examples involving mathematical expressions have been worked out. Illustrative worked examples and troubleshooting sections are included.

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### 内容概要

《分析化学手册》主要内容有Preliminary Operations of Analysis、Preliminary Separation Methods、Gravimetric and Volumetric Analysis、Chromatographic Methods、Electronic Absorption and Luminescence Spectroscopy、Infrared and Raman Spectroscopy、Atomic Spectroscopy、Optical Activity and Rotatory Dispersion、Refractometry、X-Ray Methods、Radiochemical Methods、Nuclear Magnetic Resonance Spectroscopy and Electron Spin Resonance、Mass Spectrometry、Electro analytical Methods、Thermal Analysis 等。

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## 章节摘录

1.6.4.1 Hybrid Balance. The hybrid balance is identical to the substitution balance except that the balance beam is never allowed to swing through large angular displacements when the applied loading changes. Instead the motion is very limited and when in equilibrium the beam is always restored to a predetermined reference position by a servo-controlled electromagnetic force applied to the beam. The most salient features that distinguish the electronic hybrid are the balance beam and the built-in weights utilized in conjunction with the servo restoring force to hold the beam at the null position.

1.6.4.2 Electromagnetic Force Balance. A magnetic force balances the entire load either by direct levitation or through a fixed-ratio lever system. The loading on the electromechanical mechanism that constitutes the balance is not constant but varies directly with applied load. With this design the sensitivity and response are largely controlled by the servo-system characteristics. The force associated with the sample being weighed is mechanically coupled to a servomotor that generates the opposing magnetic force. When the two forces are in equilibrium the error detector is at the reference position and the average electric current in the servomotor coil is proportional to the resultant force that is holding the mechanism at the reference position. When the applied load changes, a slight motion occurs between the fixed and moving portions of the error-detector components, resulting in a very rapid change in current through the coil.

1.6.4.3 Special Routines for Electronic Balances. Signal processing in electronic balances usually involves special computation routines:

1. Programmable stability control: Variable integration permits compensation for unstable weight readings due to environmental vibration or air currents. Preprogrammed filters minimize noise due to air currents and vibration. Four settings vary integration time, update rate of display, vibration filtering, and damping.
2. Adjustable stability range: Nine different settings (from 0.25 to 64 counts in the last significant digit) control the tolerance range within which the stability indicator appears (a symbol that appears when the actual sample weight is displayed within preset stability-range tolerances).
3. Auto tracking: This routine eliminates distracting display flicker and automatically zeroes the balance during slight weight changes. Once the balance stabilizes and displays the weight, the auto tracking feature takes over. Auto tracking can be turned off to weigh hygroscopic samples or highly volatile substances.

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