
Preface

The American Chemical Society (ACS) Committee on Analytical Reagents sets the specifications for most chemicals used in analytical testing. Currently, ACS is the only organization in the world that sets requirements and develops validated methods for determining the purity of reagent chemicals. These specifications have also become the de facto standards for chemicals used in many high-purity applications. Publications and organizations that set specifications or promulgate analytical testing methods—such as the *United States Pharmacopeia* and the U.S. Environmental Protection Agency—specify that ACS Reagent-grade purity be used in their test procedures.

The ACS Committee on Analytical Reagents evolved from the Committee on the Purity of Chemical Reagents, which was established in 1903. Analysts at that time were disturbed by the quality of reagents available and by the discrepancies between labels and the actual purity of the materials. The Committee's role in resolving these issues expanded rapidly after its 1921 publication of specifications for ammonium hydroxide and for hydrochloric, nitric, and sulfuric acids. Specifications appeared initially in *Industrial & Engineering Chemistry* and later in its *Analytical Edition*. In 1941, the existing specifications were reprinted in a single pamphlet. Revisions and new specifications were later gathered into a book, the 1950 edition of *Reagent Chemicals*, and new editions appeared regularly thereafter.

The commonplace introduction of instrumentation into analytical laboratories, beginning in the late 1950s, resulted in dramatic improvements in the sensitivity and accuracy of analytical measurements. As a result, the specifications for reagent chemicals and the tests measuring their purity were improved so that the test methods would be as accurate and cost-effective as possible. The Eighth Edition, which became official in 1993, substantially changed and updated the general procedures and attempted to make the book easier to read. The Ninth Edition, which became official in 2000, continued the trend toward eliminating or simplifying some of the tedious classical procedures for trace analysis and adding instrumental methods where possible.

Tenth Edition

Early in the planning stages for the Tenth Edition of *Reagent Chemicals*, Committee members voiced a desire for one book that met all of their needs for information on analytical

viii Reagent Chemicals

reagents. They acknowledged that *Reagent Chemicals* is used in conjunction with other texts for information on the physical properties and the uses of analytical reagents. This resulted in a new direction for *Reagent Chemicals*, the inclusion of general physical properties and analytical uses for each reagent.

The Tenth Edition continues the initiative to simplify the classical chemical methods and substitute instrumental analysis where appropriate. This edition introduces a new instrumental method, inductively coupled plasma mass spectrometry (ICP–MS) for trace metal analysis. It also revises and updates procedures for polarography. Tests have been modified to take into account current laboratory practices and technology, as well as to eliminate the use of environmentally harmful chemicals

Since the Ninth Edition, the Committee on Analytical Reagents has required validation protocols as part of the approval process for adding new reagents. In the Tenth Edition, 32 new reagents and three new classes of standard-grade reference materials are introduced, all of which have validation protocols.

Other improvements in the Tenth Edition are intended to make the book easier to use. Some of these improvements include a CAS number index, a separate index for the standard-grade reference materials, complete assay calculations with titer values, an updated table of atomic weights, frequently used mathematical equations, a quick reference page on how to read a monograph, division of the book into parts, and a detailed table of contents for each part.

Finally, a subtitle has been added to the Tenth Edition. This represents a slight shift in thinking and internal nomenclature. Traditionally, the Committee has referred to the individual entry for each reagent chemical as a specification, and each specification had two components: the requirements and the tests. However, these terms led to some confusion and, beginning with the Tenth Edition, the Committee has adopted the term *monograph* for the complete package of information for each reagent chemical—the general description, specifications, requirements, and tests. The *specification* refers to the purity requirements of the reagent, and the *requirement* is the level of purity required for the reagent to be considered “ACS Reagent Grade”.

The Work of the Committee on Analytical Reagents

As new information becomes available, the Committee updates the specifications and tests in this book and occasionally adds new reagents or deletes obsolete ones. Updates are available to the reader on the Internet at <http://pubs.acs.org/reagents>.

The membership of the Committee was increased substantially during the preparation of the previous two editions in order to provide the specific expertise needed for the new sections, new techniques, and new reagents. Charles M. Wilson leads the subcommittee on new reagents, while William E. Schmidt steers the trace metals subcommittee and Michael A. Re directs the organics subcommittee. Michael Re also leads a new subcommittee on method validation, which is responsible for developing and maintaining the validation policy that takes effect in the Tenth Edition; this subcommittee also reviews and approves all validation protocols and postvalidation documentation.

Special acknowledgment goes to the many volunteers in offices and laboratories for their valuable contributions toward developing and validating some of the analytical procedures that have greatly improved the quality of the test methods. Special thanks also go to Bob Hauserman, Anne Coghill, and Betsy Kulamer for steering the Committee and this edition toward publication, to Paula Bérard and Margaret Brown for their able editorial assistance, and to Susan Kurasz and Bennie Jones for help in preparing the manuscript.

The Committee has formal written operating procedures that describe and govern its operations. Interested parties may obtain a copy of these procedures by addressing their requests to the following:

Secretary, ACS Committee on Analytical Reagents
c/o Books Department
American Chemical Society
1155 16th Street, NW
Washington, DC 20036

Correspondence to the Committee may also be sent by e-mail; a list of current committee members and their e-mail addresses is available at <http://pubs.acs.org/reagents>.

The Committee urges that any errors observed be reported, invites constructive criticism, and welcomes suggestions, particularly for new reagents and improved test methods. Organizations wishing to adopt the ACS specifications for their own purposes are encouraged to do so by requesting permission. In this way, it is hoped that worldwide harmonization of reagent chemical specifications might occur. Communications on these subjects should be sent to the Secretary at this address. Anyone interested in serving on the Committee should also contact the Secretary.

PAUL A. BOUIS
Chair, ACS Committee on Analytical Reagents