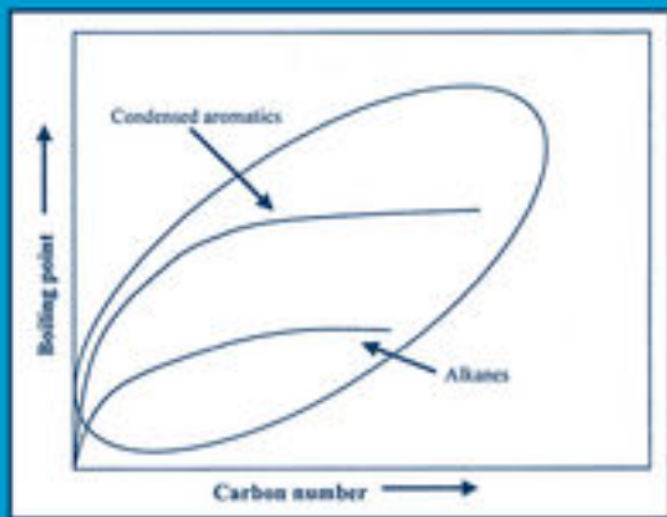


**Chemical Analysis: A Series of Monographs on
Analytical Chemistry and Its Applications**

Mark F. Vitha, Series Editor

Handbook of Petroleum Product Analysis

SECOND EDITION



JAMES G. SPEIGHT

WILEY

Handbook of Petroleum Product Analysis

JAMES G. SPEIGHT



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PREFACE

This book complements the book *Handbook of Petroleum Analysis* (J.G. Speight, John Wiley & Sons, 2001), and it is the purpose of these books to make available, in two handy volumes the essential elements of all analytical tests used to characterize petroleum and petroleum products.

It is, of course, critical for testing laboratory personnel to be fully familiar with all the details of the tests they are performing. But it is also important for nonlaboratory personnel to know at least the significance, advantages, and limitations of particular tests used to characterize product quality. Both the suppliers and the customers need to agree on the appropriate product quality specifications, and this can be achieved by understanding the intricacies of the respective test methods.

Product specifications not based on realistic testing capabilities can only lead to quality complaints and unhappiness on the part of both suppliers and customers. Therefore, we expect that this book will prove useful not only to laboratory personnel but also to product specification writers, process engineers, process scientists, researchers, and marketing staff in understanding the importance of these tests as well as their limitations, so that sound conclusions can be reached regarding the quality and performance of a particular product.

Organizations such as the American Society for Testing and Materials (ASTM) in the United States, the Institute of Petroleum (IP, London, U.K.), the Association Française de Normalisation (AFNOR, Paris, France), the Deutsche Institut für Normung (DIN, Germany), the Japan Industrial Standards (JIS, Tokyo, Japan), and the International Organization for Standardization (ISO, Geneva, Switzerland) have made significant contributions in developing standard test methods for the analyses of petroleum products. Although it is not possible to include all of the test methods of these organizations, cross-reference is made of the standard methods of analysis of the ASTM to those that are known for the IP.

In addition, the ASTM has discontinued several of the tests cited in the text for testing and materials, but they are included here because of their continued use by analytical laboratories. Several tests may even have been modified for internal company use, and there is no way of authenticating such use. Indeed, many tests should be adopted for internal company use

instead of existing in-house testing protocols. For example, one might read in the published literature of the use of modified naphtha to precipitate an asphaltene fraction. Such a statement is meaningless without precise definition of the chemical composition of the modified naphtha. Naphtha is a complex petroleum product that can vary depending on the method of production. So, without any qualification or chemical description of the modified naphtha, a comparison of the precipitate with a pentane-asphaltene or heptane-asphaltene will be futile. Indeed, cross-comparisons within the in-house laboratories may be difficult if not impossible. The moral of this tale is that testing protocols *should* be standardized!

It is not intended that this book should replace the *Annual Book of ASTM Standards*. This book is intended to be a complementary volume that contains explanations of the *raison d'être* of the various test methods.

Each chapter is written as a stand-alone unit, which has necessitated some repetition. This repetition is considered necessary for the reader to have all of the relevant information at hand, especially where there are tests that can be applied to several products. Where this is not possible, cross-references to the pertinent chapter(s) are included. Several general references are listed for the reader to consult for a more detailed description of petroleum products. No attempt has been made to be exhaustive in the citations of such works. Thereafter, the focus is to cite the relevant test methods that are applied to petroleum products.

Finally, in this book, no preference is given to any particular tests. All lists of tests are alphabetical.

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