Foreword

A substantial scientific achievement of last 50 years was the creation of new silicon-based compounds, organosilicons [118]. Progress in synthesis theory, as well as the discovery of unique properties of organosilicons, have made large-scale production of new compounds possible. There were obstacles that posed considerable problems both for consumers and for investigators of properties of substances. Starting in the Sixties, commercial-scale production of organosilicons, which only started about 40 years ago, has doubled in capacity approximately every five years.

Because of their unique properties, organosilicons have found wide application in different areas of science and technology. This gives us a powerful incentive to investigate their thermophysical properties, as this knowledge provides new possibilities for the more efficient use of new substances, and for the development of new technologies and equipment.

Presently, however, a significant, still growing gap exists between the need for and the availability of thermophysical data in science and industry. There are two reasons for this gap: we lack a theory of liquid state, and have to deal with expanding nomenclature of new organosilicons [89, 118]. Efforts to minimize this gap, based solely on experimental data and empirical correlations, do not, and can not give positive results.

What is urgently needed in this situation, is to develop semiempirical methods of estimating such properties. Such methods would be based on the analysis and generalization of the available body of experimental data [51, 89]. In the literature, both in Russia and abroad, there are almost no published papers concerning the systematization and generalization of thermophysical properties of organosilicons; this is understandable in view of the paucity of pertinent experimental evidence [51, 89].

The aim of the authors of the present handbook is to apply existing techniques, developed for investigation of other substances, to estimate the properties of organosilicons in a wide range of parameters.

The computational results summarized in the handbook were obtained using methods based on both the principle of thermodynamic similarity and on the additive principle [17, 99].

Usage of the thermodynamic similarity principle was appropriate where we had available the experimental information required to determine both the reference scales and the temperature dependence of the property.

The additive principle was used to estimate the properties of organosilicons in so called "standard" state ($T = 293.15$ K, $p = 1.03 \cdot 10^5$ Pa). The numerical values thus obtained subsequently enabled us to use the thermodynamic similarity principle.

The numerical values presented in the handbook qualify as "informational" in accordance with GOST 8.310–78.

We wish to express particular gratitude to Professor A.A.Gukhman for his helpful discussions and suggestions, which are reflected in the material appearing in the Section 1 of the handbook.

We would be thankful for feedback on this handbook. The readers are kindly requested to use the following address: The Begell House Inc. Publishers, 79 Madison Av., New York, NY 10016-7892.