
Preface

This book is the result of the experience gained over the years on the learning and teaching the subject of thermodynamics in metal and materials systems. The authors still remember how painful it is to do well in such courses, and are sympathetic to those students currently undergoing such ordeal.

On the other hand, the authors have realized over the years that thermodynamics is not a nightmare; and in fact they have come to a realization that this subject is not as complex as many believe it to be.

Hence, this text was created. It is designed to serve as a complement to more extensive textbooks. The main idea is to show full solutions of problems commonly taught in chemical thermodynamics, thermochemistry or simple thermodynamics courses. The fully solved problems presented in this manuscript are not only found in academics, some of them are also found (quite frequently) in major metallurgical operations. It has been sought as a balance between merely academic problems and industry-related ones. The problems shown in the text are to ease the understanding of key concepts and help students overcome their fear to this simple yet powerful tool for process analysis.

The book also includes some theory; however, we tried to keep the concepts described in the text as simple as possible and it has been attempted to use a friendly language appealing to students.

In the end, we expect that the students and those who have an opportunity to check on the book might experience a pleasant time learning this subject matter.

Most of the examples in the book were modified versions of those taken from *Collection of problems in chemical metallurgy and materials science* by Toguri et al. The data used to solve the problems were taken from HSC Chemistry V6.1 by A. Roine, Hultgren's et al. book *Selected values of thermodynamic properties of metals and alloys* and from Alcock and Kubaschewski's *Materials Thermochemistry, 6th Edition*. The phase diagrams shown in Chap. 5 were drawn using TAPP V2.2 software.

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