

Part IX : The annotated bibliography

Module 1 : Supplementary information

1 Texts for phase transformation courses

Phase transformations are an important area of study; there are many wonderful textbooks and monographs that are available. As noted in the modules, the primary texts that we recommend are those of Porter, Easterling and Sherif, and Raghavan. For a beginner's course, these two textbooks are quite good.

In addition, we have also listed several additional texts; wherever possible, we have also indicated their level of difficulty, namely introductory, intermediate and advanced. Note that in our classification, Porter et al and Raghavan will be considered as intermediate textbooks.

Finally, we have also listed some advanced texts and monographs. Some of the additional texts and advanced monographs deal not only with phase transformations and physical metallurgy but also with thermodynamics and diffusion which form the basis for a detailed discussion on many fundamental aspects of phase transformations.

The listing here is not exhaustive; it is also heavily influenced by our tastes and interests; and, we would love to hear from you of any texts which you think should be listed here that we have not.

There are not many textbooks that we are aware of, on phase transformations, that deal with the heat treatment aspects in any greater detail.

2 Primary Texts for the Course

1. David A Porter, Kenneth E Easterling and Mohamed Y Sherif Phase Transformations in Metals and Alloys Third Edition, CRC Press (2009).
2. V Raghavan Solid state phase transformations First edition, Prentice Hall of India Pvt. Ltd., 1992.

2.1 Additional Texts

1. Robert E Reed-Hill Physical Metallurgy Principles Second edition, Affiliated East-West Press Pvt. Ltd., 2008. Introductory / Intermediate level textbook; can be perused for self-study. We strongly recommend. If you are trying to build a personal collection of books on phase transformations, after Porter et al and Raghavan, this is the book that we would recommend next.
2. A K Jena and M C Chaturvedi Phase Transformation in Materials First edition, Prentice Hall, 1991. A textbook at the same level as Porter et al.
3. P G Shewmon Transformations in Metals Indo American books, 2006. A slightly older textbook at introductory level.
4. P Haasen Physical Metallurgy Third edition, Cambridge University Press, 1996. Advanced textbook; a very concise introduction to many topics; the reader who is familiar with the material will benefit.
5. J W Martin, R D Doherty and B Cantor Stability of Microstructures in Metallic Systems Second edition, Cambridge University Press, 1997. Advanced level textbook with primary emphasis on the stability of microstructures.
6. G Gottstein Physical Foundations of Materials Science First edition, Springer, 2004. Introductory textbook.
7. H K D H Bhadeshia and Honeycombe Steels: Microstructure and Properties Third edition, Butterworth-Heinemann, 2006.
8. H K D H Bhadeshia: Worked Examples in the Geometry of Crystals Freely available online: <http://www.msm.cam.ac.uk/phase-trans/2001/crystal.html> A must-read if you are interested in the crystallographic aspects of phase transformations.
9. R E Smallman and R J Bishop Modern Physical Metallurgy and Materials Engineering: Science, Process, Applications Butterworth-Heinemann, 1999.
10. P G Shewmon Diffusion in Solids Second edition, Wiley, 1999. A standard reference for diffusion.
11. D R Gaskell Introduction to the Thermodynamics of Materials Fifth edition, Taylor & Francis, 2008. A standard reference for the basic materials thermodynamics.

Advanced Texts

1. M Hillert Phase Equilibria, Phase Diagrams and Phase Transformations: Their Thermodynamics Basis Second edition, Cambridge University Press, 2007.

2. H I Aaronson (Editor) Lectures on the Theory of Phase Transformations Second edition, Wiley, 2001.
3. H I Aaronson, M Enomoto and J K Lee Mechanisms of Diffusional Phase Transformations in Metals and Alloys CRC press, 2010. Based on the class notes of Aaronson; in 9 chapters, all the topics discussed by us get an in-depth treatment.
4. A G Khachaturyan Theory of Structural Transformations in Solids Dover publications, 2008. An unmistakable classic.
5. R W Cahn and P Haasen Physical Metallurgy, in 3 volumes Fourth edition, Elsevier, 1996.
6. R W Cahn, P Haasen, and E J Kramer (Editors) Phase Transformations in Materials, Volume 5 of Materials Science and Technology: A Comprehensive Treatment VCH Publishers Inc, 1991.
7. J W Christian The Theory of Transformations in Metals and Alloys (Part I and II) Third edition, Newnes, 2002. Another classic; not meant for self-study. The mathematical theory of twinning is treated very extensively (among other things).
8. A P Sutton and R W Balluffi Interfaces in Crystalline Materials Clarendon Press, 1995. A classic; if phase transformations can be considered as the method of producing interesting interfaces in materials, this is the book that contains everything you need to know about interfaces. Fairly mathematical.
9. R W Balluffi, S M Allen, W C Carter Kinetics of Materials Wiley, 2005. A fairly advanced text; but reader friendly.
10. J A Dantzig and M A Rappaz Solidification First edition, EPFL Press, 2001. We have not dealt with solidification, probably one of the most important transformations, in this course, in any great detail. This is a good textbook for solidification theory. In the introduction, the authors also refer to other earlier textbooks.
11. T Mura Micromechanics of Defects in Solids Second edition, Martinus Nijhoff publishers, 1991. Not really a phase transformations textbook; however, if one is interested in elastic stress effects, this is a must-read.
12. W C Carter and W C Johnson The Selected works of John W Cahn TMS, 1998. J W Cahn is one of the pioneers in the study of materials and phase transformations. This is a good advanced level book with each paper prefaced by a commentary.

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