

FUNDAMENTALS OF SOLIDIFICATION
FIFTH - FULLY REVISED EDITION
W. Kurz, D.J. Fisher and M. Rappaz

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e-ISBN - 978-3-0364-1015-9

Link to the [5th edition eBook](#)

The 5th 2023 edition contains numerous crucial advances to the modelling and the basic understanding of solidification phenomena, and experimental results. There is a new final chapter on *microstructure-selection* which explains how to combine the concepts of the preceding chapters for modelling real microstructures, in complex processes such as additive manufacturing and the new detailed *phase-field* appendix which opens the door to the accurate computer-modelling of growth-forms.

This new edition is presented at three levels in the same praised manner as in the former editions:

- an initial feel for the subject; a deeper understanding of the underlying physics; 15 appendices with detailed analysis of the various theories.

Some of the paradigm-shifting additions are:

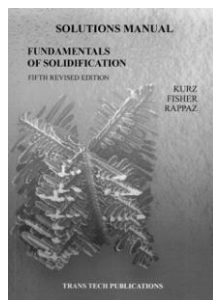
- ✓ General approach to *solidification microstructure selection*
- ✓ The *phase-field method*,
- ✓ The *diffuse interface* and its *anisotropy*
- ✓ A new *dendrite spacing model*
- ✓ The effects of *melt-flow* upon dendrite growth
- ✓ Conditions for *coupled peritectic growth* and *Coupled zone* of eutectics
- ✓ Stable to metastable *phase selection* in rapid solidification processing
- ✓ Application of solidification concepts to *additive manufacturing*
- ✓ *In situ* synchrotron X-ray *imaging* of solidifying metals.

For many more, see [here](#) the Table of Content

Undergraduate and graduate levels and professional's Readership level

This book provides the student with an introduction to modern solidification theory; the researcher with the fundamentals of the more quantitative models for predicting solidification microstructures; and the industry professional and/or the welding engineer with a framework into which he can fit his diverse observations.

Noteworthy is that the **print book** is in **colour**, very helpful for the understanding of the equations and associated figures.



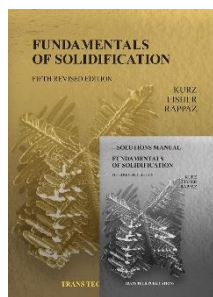
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