



# Non-Equilibrium Thermodynamics for Engineers

*S Kjelstrup, D Bedeaux, E Johannessen, J Gross*

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**Non-Equilibrium Thermodynamics for Engineers** S Kjelstrup, D Bedeaux, E Johannessen, J Gross

The book describes in a simple and practical way what non-equilibrium thermodynamics is and how it can add to engineering fields. It explains how to describe proper equations of transport, more precise than used so far, and how to use them to understand the waste of energy resources in central unit processes in the industry. It introduces the entropy balance as an additional equation to use, to create consistent thermodynamic models, and a systematic method for minimizing energy losses that are connected with transport of heat, mass, charge, momentum and chemical reactions.

## Contents:

- Scope
- Why Non-Equilibrium Thermodynamics?
- The Entropy Production of One-Dimensional Transport Processes
- Flux Equations and Transport Coefficients
- Non-Isothermal Multi-Component Diffusion
- Systems with Shear Flow
- Chemical Reactions
- The Lost Work in the Aluminum Electrolysis
- The State of Minimum Entropy Production and Optimal Control Theory
- The State of Minimum Entropy Production in Selected Process Units

**Readership:** Senior undergraduate and graduate students in physics, chemistry, chemical engineering and mechanical engineering.

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