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| Altri autori (Persone) | BedeauxDick |
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| Nota di bibliografia | Includes bibliographical references (p. 393-413) and index. |
| Nota di contenuto | Contents; Preface; 1 Scope; 1.1 What is non-equilibrium thermodynamics?; 1.2 Non-equilibrium thermodynamics in the context of other theories; 1.3 The purpose of this book; 2 Why Non-Equilibrium Thermodynamics?; 2.1 Simple flux equations; 2.2 Flux equations with coupling terms; 2.3 Experimental designs and controls; 2.4 Entropy production, work and lost work; 2.5 Consistent thermodynamic models; 3 Thermodynamic Relations for Heterogeneous Systems; 3.1 Two homogeneous phases separated by a surface in global equilibrium; 3.2 The contact line in global equilibrium<br>3.3 Defining thermodynamic variables for the surface 3.4 Local thermodynamic identities; 3.5 Defining local equilibrium; 3.A Appendix: Partial molar properties; 3.A.1 Homogeneous phases; 3.A.2 The surface; 3.A.3 The standard state; Part A: General Theory; 4 The Entropy Production for a Homogeneous Phase; 4.1 Balance equations; 4.2 The entropy production; 4.2.1 Why one should not use the dissipation function; 4.2.2 States with minimum entropy production; 4.3 Examples; 4.4 Frames of reference for fluxes in homogeneous systems; 4.4.1 Definitions of frames of reference<br>4.4.2 Transformations between the frames of reference 4.A Appendix: |

The first law and the heat flux; 5 The Excess Entropy Production for the Surface; 5.1 The discrete nature of the surface; 5.2 The behavior of the electric fields and potential through the surface; 5.3 Balance equations; 5.4 The excess entropy production; 5.4.1 Reversible processes at the interface and the Nernst equation; 5.4.2 The surface potential jump at the hydrogen electrode; 5.5 Examples; 6 The Excess Entropy Production for a Three Phase Contact Line; 6.1 The discrete nature of the contact line; 6.2 Balance equations
6.3 The excess entropy production  6.4 Stationary states; 6.5 Concluding comment; 7 Flux Equations and Onsager Relations; 7.1 Flux-force relations; 7.2 Onsager's reciprocal relations; 7.3 Relaxation to equilibrium. Consequences of violating Onsager relations; 7.4 Force-flux relations; 7.5 Coefficient bounds; 7.6 The Curie principle applied to surfaces and contact lines; 8 Transport of Heat and Mass; 8.1 The homogeneous phases; 8.2 Coefficient values for homogeneous phases; 8.3 The surface; 8.3.1 Heats of transfer for the surface; 8.4 Solution for the heterogeneous system
8.5 Scaling relations between surface and bulk resistivities 9 Transport of Heat and Charg; 9.1 The homogeneous phases; 9.2 The surface; 9.3 Thermoelectric coolers; 9.4 Thermoelectric generators; 9.5 Solution for the heterogeneous system; 10 Transport of Mass and Charge; 10.1 The electrolyte; 10.2 The electrode surfaces; 10.3 Solution for the heterogeneous system; 10.4 A salt power plant; 10.5 Electric power from volume flow; 10.6 Ionic mobility model for the electrolyte; 10.7 Ionic and electronic model for the surface; Part B: Applications; 11 Evaporation and Condensation
11.1 Evaporation and condensation in a pure fluid

Sommario/riassunto

The purpose of this book is to encourage the use of non-equilibrium thermodynamics to describe transport in complex, heterogeneous media. With large coupling effects between the transport of heat, mass, charge and chemical reactions at surfaces, it is important to know how one should properly integrate across systems where different phases are in contact. No other book gives a prescription of how to set up flux equations for transports across heterogeneous systems.  The authors apply the thermodynamic description in terms of excess densities, developed by Gibbs for equilibrium, to non-equilib

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