1. Record Nr. UNINA9910133645003321

Titolo	Modern drying technology . Volume 1 Computational tools at differents cales [[electronic resource] /] / edited by Evangelos Tsotsas and Arun S. Mujumdar
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, c2007
ISBN	1-283-37043-3 9786613370433 3-527-63163-1 3-527-63162-3
Descrizione fisica	1 online resource (360 p.)
Collana	Modern Drying Technology
Altri autori (Persone)	TsotsasEvangelos MujumdarA. S
Disciplina	660.2842 660.28426
Soggetti	Drying Chemistry, Technical Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Modern Drying Technology Volume- 1; Contents; Series Preface; Preface of Volume 1; List of Contributors; Recommended Notation; EFCE Working Party on Drying: Address List; 1 Comprehensive Drying Models based on Volume Averaging: Background, Application and Perspective; 1.1 Microscopic Foundations of the Macroscopic Formulation; 1.2 The Macroscopic Set of Equations; 1.3 Physical Phenomena Embedded in the Equations; 1.3.1 Low-temperature Convective Drying; 1.3.1.1 The Constant Drying Rate Period; 1.3.1.2 The Decreasing Drying Rate Period 1.3.2 Drying at High Temperature: The Effect of Internal Pressure on Mass Transfer1.4 Computational Strategy to Solve the Comprehensive Set of Macroscopic Equations; 1.4.1 The Control-volume Finite-element (CV-FE) Discretization Procedure; 1.4.2 Evaluation of the Tensor Terms at the CV Face; 1.4.3 Solution of the Nonlinear System; 1.4.3.1 Outer (Nonlinear) Iterations; 1.4.3.2 Construction of the Jacobian; 1.4.3.3

Inner (Linearized System) Iterations; 1.5 Possibilities Offered by this Modeling Approach: Convective Drying; 1.5.1 High-temperature Convective Drying of Light Concrete
1.5.1.1 Test 1: Superheated Steam1.5.1.2 Tests 2 and 3: Moist Air, Soft and Severe Conditions; 1.5.2 Typical Drying Behavior of Softwood: Difference Between Sapwood and Heartwood; 1.6 Possibilities Offered by this Modeling Approach: Less-common Drying Configurations; 1.6.1 Drying with Volumetric Heating; 1.6.2 The Concept of Identity Drying Card (IDC); 1.6.3 Drying of Highly Deformable Materials; 1.7 Homogenization as a Way to Supply the Code with Physical Parameters; 1.8 The Multiscale Approach; 1.8.1 Limitations of the Macroscopic Formulation
1.8.2 The Stack Model: An Example of Multiscale Model1.8.2.1 Global Scale; 1.8.2.2 Local Scale; 1.8.2.3 Coupling Approach; 1.8.2.4 Samples Simulations; 1.8.2.5 Accounting for Wood Variability; 1.8.2.6 Accounting for Drying Quality; Conclusion; 2 Pore-network Models: A Powerful Tool to Study Drying at the Pore Level and Understand the Influence of Structure on Drying Kinetics; 2.1 Introduction; 2.2 Isothermal Drying Model; 2.2.1 Model Description; 2.2.1.1 Network Geometry and Corresponding Data Structures; 2.2.1.2 Boundary-layer Modeling; 2.2.1.3 Saturation of Pores and Throats
2.2.1.4 Vapor Transfer2.2.1.5 Capillary Pumping of Liquid; 2.2.1.6 Cluster Labeling; 2.2.1.7 Drying Algorithm; 2.2.2 Simulation Results and Experimental Validation; 2.2.3 Gravity and Liquid Viscosity - Stabilized Drying Front; 2.2.3.1 Modeling Gravity; 2.2.3.2 Modeling Liquid Viscosity; 2.2.3.3 Dimensionless Numbers and Length Scales; 2.2.3.4 Phase Distributions and Drying Curves; 2.2.4 Film Flow; 2.2.5 Wettability Effects; 2.2.6 First Drying Period; 2.3 Model Extensions; 2.3.1 Heat Transfer; 2.3.2 Multicomponent Liquid; 2.4 Influence of Pore Structure; 2.4.1 Pore Shapes
2.4.2 Coordination Number

Sommario/riassunto

This five-volume handbook provides a comprehensive overview of all important aspects of modern drying technology, including only advanced results. Volume 1 deals with computational tools at different scales, including homogenized, pore network and continuous thermo-mechanical models, computational fluid dynamics and population balances, as well as process systems simulation tools. High-level, cutting-edge results on a mandatory industrial process.