1. Record Nr. UNINA9910132210603321

Autore	Daian Jean-Francois
Titolo	Equilibrium and transfer in porous media 2 : transfer laws / / Jean-Francois Daian
Pubbl/distr/stampa	London ; ; Hoboken, New Jersey : , : ISTE : , : Wiley, , 2014 ©2014
ISBN	1-118-93126-2 1-118-93125-4 1-118-93127-0
Edizione	[1st ed.]
Descrizione fisica	1 online resource (230 p.)
Collana	Civil Engineering and Geomechanics Series
Disciplina	620.116
Soggetti	Porous materials Porous materials - Fluid dynamics Porous materials - Permeability Transport theory - Porous material
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	Cover; Title Page; Contents; Nomenclature; Chapter 1. Transport and Transfer: from Homogeneous Phases to Porous Media; 1.1. Transfer phenomena: complementary approaches; 1.1.1. Transfer processes and couplings; 1.1.2. Continuums and molecular aspect; 1.2. Usual formulations for homogeneous phases; 1.2.1. FLOW of a viscous fluid; 1.2.2. Isothermal diffusion; 1.2.3. Thermal conduction. Fourier's law; 1.3. Transfers in porous media, macroscopization; 1.3.1. General approach of macroscopization; 1.3.2. Fundamental concepts of macroscopization; 1.3.3. Conditions of validity of macroscopization 1.3.4. Obtaining the macroscopic transfer laws1.4. Porous media: elementary balances and transfer laws; 1.4.1. Rules of play; 1.4.2. Filtration of a fluid saturating the pore space: Darcy's law; 1.4.3. Isothermal molecular diffusion in the gaseous or liquid phase saturating the pore space; 1.4.4. Thermal conduction in a composite medium; 1.5. Appendices; 1.5.1. Mechanics and thermodynamics of homogeneous phases: the continuum approach; 1.5.2. Thermodynamic balances. Overview of the thermodynamics of irreversible processes

(TIP); 1.5.3. Transfers in porous media: the TIP approach
1.5.4. Three examples of macroscopization by spatial averaging1.5.5. Inertial flows: the Dupuit-Forchheimer law; 1.5.6. Transfer of dissolved matter. Hydrodynamic dispersion; 1.5.7. Composites and mixing laws; 1.5.8. Transfers and percolation theory; 1.5.9. Viscous stress. Poiseuille's law; 1.5.10. A look at non-equilibrium transfers; Chapter 2. Isothermal Transport in the Pore Space; 2.1. Laws of transport in the pore space occupied by one or two phases: additional points; 2.1.1. Diffusion and filtration in porous media occupied by two immiscible fluids
2.1.2. Porometric distribution and transport in the gaseous phase Knudsen and Klinkenberg effects2.1.3. Transport with phase-change isothermal transport of a volatile liquid; 2.2. A classification of Isothermal transport processes constitutive equations boundary conditions; 2.2.1. General definitions vocabulary; 2.2.2. Filtration under an isobaric atmosphere of a capillary liquid, which may be volatile; 2.2.3. Filtration of a volatile liquid and of its pure vapor; 2.2.4. Linearized constitutive equations; 2.2.5. Transport of a gas or a non-condensible gaseous component
2.2.6. Transport in porous media of matter dissolved in the liquid phase2.2.7. Other isothermal transport processes; 2.3. Appendices and exercises; 2.3.1. Two-phase filtration macroscopization; 2.3.2. Transport in the gaseous phase and kinetic theory of gases; 2.3.3. Isothermal transport of a volatile liquid: proportion of each of the PHASEs; 2.3.4. Isothermal transport of a volatile liquid: illumination of the effective medium theory (EMT); 2.3.5. Illumination of the self-consistent theory (SCT); 2.3.6. Percolation theory, conductivity, permeability; Glossary; Bibliography; Index
Summary of other Volumes in the Series

Sommario/riassunto

A porous medium is composed of a solid matrix and its geometrical complement: the pore space. This pore space can be occupied by one or more fluids. The understanding of transport phenomena in porous media is a challenging intellectual task. This book provides a detailed analysis of the aspects required for the understanding of many experimental techniques in the field of porous media transport phenomena. It is aimed at studentsor engineers who may not be looking specifically to become theoreticians in porous media, but wish to integrate knowledge of porous media with t