

Contents

1	Interactions in Water Across Interfaces: From Nano to Macro-Scale Perspective	1
	Rosa M. Espinosa-Marzal	
Part I Flow, from Nano- to Mega-Scale		
2	Confined Water in Carbon Nanotubes and Its Applications.....	19
	Seul Ki Youn, Jakob Buchheim, and Hyung Gyu Park	
3	Static and Dynamic Capillarity in Silicon Based Nanochannels	29
	Niels Tas, Nataliya Brunets, Joost W. van Honschoten, Jeroen Haneveld, and Henri V. Jansen	
4	Infrared-Thermodynamics Conversion as a Function of Temperature: Towards Confined Water	43
	Isabelle Bergonzi and Lionel Mercury	
5	Interchange of Infiltrating and Resident Water in Partially Saturated Media	55
	Brian Berkowitz	
6	Impact of Heterogeneity on Evaporation from Bare Soils	67
	Shmuel Assouline, Kfir Narkis, Stéphanie Veran-Tissoires, Manuel Marcoux, and Marc Prat	
Part II Ions, Hydration, and Transport		
7	Enhanced Ion Transport in 2-nm Silica Nanochannels	83
	Chuanhua Duan	
8	Ionic and Molecular Transport Through Graphene Membranes	95
	Rohit Karnik	

- 9 **Molecular Structure and Dynamics of Nano-Confined Water: Computer Simulations of Aqueous Species in Clay, Cement, and Polymer Membranes**
Andrey G. Kalinichev
- 10 **Two Generalizations of the Theory of Seismoelectric Effect: Parameterization Providing Suitability of Frenkel's Theory for Any Geometry of Soil's Pore Space. The Role of Thermoosmosis in Seismoelectric Effect** 1
Vladimir N. Shilov

Part III In-Pores/Channels Cavitation

- 11 **Evaporation-Induced Cavitation in Nanofluidic Channels: Dynamics and Origin**..... 1
Chuanhua Duan
- 12 **Electrocavitation in Nanochannels**
Daniel S. van Schoot, Kjeld G.H. Janssen, Niels R. Tas, Thomas Hankemeier, and Jan C.T. Eijkel
- 13 **Stability and Negative Pressure in Bulk and Confined Liquids**
Attila R. Imre
- 14 **Experimental Superheating and Cavitation of Water and Solutions at Spinodal-Like Negative Pressures**.....
Lionel Mercury and Kirill I. Shmulovich
- 15 **Plant Water Transport and Cavitation**
Teemu Hölttä and John Sperry

Part IV Crystallization Under Confinement

- 16 **Crystal Growth and Phase Equilibria in Porous Materials**
Michael Steiger
- 17 **Shaping the Interface – Interactions Between Confined Water and the Confining Solid**
Dag Kristian Dysthe
- 18 **Geochemistry of Capillary Hydrogeochemical Systems in Arid Environments**
Arnault Lassin, Lionel Mercury, and Mohamed Azaroual
- 19 **Evaporation from a Porous Medium in the Presence of Salt Crystallization**
Marc Prat

20	Micro-CT Analysis to Explore Salt Precipitation Impact on Porous Media Permeability	231
	Noam Weisbrod, Uri Nachshon, Maria Dragila, and Avrami Grader	
21	Reactive Transport in Heterogeneous Media	243
	Harvey Scher and Brian Berkowitz	
22	Extraction of Water from the Atmosphere in Arid Areas by Employing Composites “A Salt Inside a Porous Matrix”	257
	Larisa Gordeeva and Yuri Aristov	