Contents

Foreword						
Preface		xi				
Introductio	n	X				
Nomenclati	ure	xi				
Chapter 1	Hvd	Hydrodynamics and Heat Transfer at Single-Phase Flow in Capillary and Slit Channels				
•						
		•				
	1.1	Hydrodynamics and Heat Transfer of Steady				
		Single-Phase Flow in Capillaries and Slits				
	1.2	Hydrodynamics and Heat Transfer of				
		Nonsteady Single-Phase Laminar Flow				
	1.3	Hydrodynamics and Heat Transfer of Single-Phase				
		Turbulent Flow in Capillaries and Slits				
Chapter 2	Hydrodynamics and Heat Transfer at					
•		Single-Phase Flow through Porous Media				
		•				
	2.1	Physical Fundamentals, Models, and Equations				
		of Momentum and Heat Transfer at Single-Flow				
		through Porous Media				
	2.2	Effective Thermal Conductivity				
		of Porous Structures20				
	2.3	Internal Heat Transfer in Porous Media28				
	2.4	Heat Transfer on the Porous				
		Structure External Surface				
Chapter 3	Thermohydrodynamics at Vaporization					
•		inside Capillary-Porous Structures41				
	3.1	Vaporization Conditions in Capillaries				
		and Capillary-Porous Structures41				
	3.2	Hydrodynamics at Vaporization in				
		Capillary-Porous Structures45				
	3.3	Fundamental Principle of "Irreversibility Minimum"				
		in Two-Phase Filtration Modeling55				
	3.4	Investigations of Vaporization in Porous Structures				
	•	with Internal Heat Generation63				
	3.5	Experimental Investigations of Internal Characteristics				
		and Mechanisms of Thermohydrodynamic Phenomena71				
		• • • • • • • • • • • • • • • • • • •				

Chapter 4	Thermohydrodynamics at Vaporization in Slit and Capillary Channels93						
	4.1	Experimental Studies on Heat Transfer at					
			Boiling in Slits and Capillary Channels93				
	4.2		lynamic Phenomena and Vaporization				
			and Capillary Channels				
	4.3		mental Studies of Vaporization Mechanism				
			n Slits and Annular Channels				
	4.4		al Imaginations and Theoretical				
			s for Heat Transfer at Vaporization				
			ical Slits and Capillaries				
	4.5	•	al Imaginations and Theoretical Models				
			at Transfer at Vaporization in Horizontal				
		and Sh	ort Slits and Capillaries				
Chapter 5	Heat and Mass Transfer at Vaporization on						
	Surfaces with Capillary-Porous Coverings						
	5.1	Experi	Experimental Investigations of Vaporization Heat				
		Transf	Transfer on Surfaces with Porous Coatings				
		5.1.1	Experimental Investigations of				
			Boiling Heat Transfer on Coated				
			Surfaces in Subcritical Thermal Regimes 163				
		5.1.2	Experimental Investigations of				
			Boiling Heat Transfer on Surfaces				
			Covered by Screen Wicks 168				
		5.1.3	Experimental Investigations of Vaporization				
			Heat Transfer on Fiber-Metal Surfaces 182				
		5.1.4	Experimental Investigations of Vaporization				
			Heat Transfer on Surfaces Covered by				
			Corrugated Structures				
		5.1.5	Experimental Investigations of Heat Transfer				
			inside Evaporators of Loop Heat Pipes				
		5.1.6	Experimental Investigations of Boiling				
			Heat Transfer on Surfaces Covered by				
			Sintered and Gas-Sprayed Coatings201				
	5.2	Exper	iments on Heat Transfer at Vaporization on				
		_	es with Sintered Coatings: The Malyshenko				
			menological Theory of Boiling				
	5.3		al Imaginations and Models of Vaporization				
			rfaces with Porous Coatings				
	5.4		al Model of Vaporization Processes				
			Coated Surfaces (the Third Stage)				

	5.5	Heat Transfer at Vaporization on Surfaces
		Covered by Movable Capillary Structures271
	5.6	Models of Heat Transfer inside Evaporators of
		LHP and Capillary Pumped Loops291
Chapter 6	Heat	Transfer Crises at Vaporization Inside Slits, Capillaries,
	and o	on Surfaces Covered by Capillary-Porous Structures299
	6.1	Physical Explanations and Semiempirical
		Models of Boiling Heat Transfer Crisis299
	6.2	Modified Hydrodynamic Theory of
		Boiling Crises in Restricted Spaces
	6.3	Experiments on Boiling Heat Transfer Crisis at
		Forced Liquid Flow in Slits and Capillary Tubes305
		6.3.1 Boiling Crisis at Forced Flow in Capillaries306
		6.3.2 Boiling Heat Transfer Crisis at Low-Velocity
		Flow inside Annular Capillary Channels
		6.3.3 Experimental Investigation of the CHF at Forced
		Flow in Capillaries: Modified Hydrodynamic
		Theory of Boiling Heat Transfer Crisis
		6.3.4 CHF in Narrow Annular Channels
		(Experimental Data and Semiempirical Models) 326
	6.4	Experimental Research on the CHF at Pool Boiling in
		Slits, Capillaries, and Corrugated Capillary Channels 330
	6.5	Experimental Research on Heat Transfer Crisis
		at Boiling on Surfaces with Porous Coverings
	6.6	Maximum Heat Fluxes Inside Heat Pipes
-		
Keferences	••••••	
Index		371