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Nota di contenuto	CONTENTS -- PREFACE -- ACKNOWLEDGMENTS -- NOMENCLATURE -- Chapter 1 Thermal Protection System Conception -- 1.1 Planetary Reentry -- 1.2 Orders of Magnitude -- 1.3 Major Classes of Materials for Thermal Protection Systems -- 1.4 Physical Problems -- Chapter 2 Conservation Laws for a Multispecies Gaseous Medium -- 2.1 Introduction -- 2.2 Conservation Laws -- 2.3 Diffusion in Neutral Medium -- 2.4 Diffusion in Weakly Charged Media -- 2.5 Calculation of Transport Coefficients -- 2.6 Medium in Thermodynamic Nonequilibrium -- Chapter 3 Elementary Chemical Reactions Modeling -- 3.1 Gaseous Reactions -- 3.2 Heterogeneous Reactions -- 3.3 Relationship Between Homogeneous and Heterogeneous Reactions -- Chapter 4 Approximate Methods -- 4.1 Introduction -- 4.2 Reactive Laminar Boundary Layers -- 4.3 Injection (Blowing or Blocking) Coefficient -- 4.4 The Couette Problem Analogy -- 4.5 Approximate Calculation of Stagnation Point Heat Flux -- 4.6 Mass and Energy Balance at Wall -- 4.7 Steady State Ablation -- Chapter 5 Ablation of Carbon -- 5.1 Oxidation -- 5.2 Reactions with Nitrogen -- 5.3 Sublimation -- 5.4 Relations of Dependence -- 5.5 Reaction Kinetics -- 5.6 Homogeneous Reactions -- 5.7 Example: Homogeneous Medium -- 5.8 Partition of Energy -- 5.9 Relation Between Incident Flux and Ablation -- 5.10 Precision of the Ablation Model -- 5.11 Example of Calculation: A Test with Constant Upstream Conditions -- Chapter 6 Roughness Formation -- 6.1 General Considerations -- 6.2

Scales of the Problem -- 6.3 Reactivity of a Composite Material -- 6.4 Roughness Formation -- 6.5 Applications -- Chapter 7 Turbulence and Laminar-Turbulent Transition -- 7.1 Coupling Between Turbulence and Surface State -- 7.2 Nonlocal Effects of Turbulence -- 7.3 Coupling Between Turbulence and Chemical Reactions -- 7.4 Laminar-Turbulent Transition -- Chapter 8 Pyrolysis and Pyrolyzable Materials -- 8.1 A Simple Example: PTFE -- 8.2 Phenolic Resin -- 8.3 The General Model -- 8.4 The Different Levels of Solutions -- 8.5 Transport Properties -- 8.6 Application Example -- 8.7 Ablation of Carbon Phenolics -- Chapter 9 Materials Developing a Liquid Layer -- 9.1 Hydrodynamics of the Liquid Layer -- 9.2 Silica-Resin Materials -- Chapter 10 Radiation -- 10.1 Introduction -- 10.2 Radiative Transfer Equation -- 10.3 Effects of Coupling Between Flow and Radiation -- 10.4 Radiation in Porous Media -- Chapter 11 Erosion by Particle Impact -- 11.1 Introduction: Phenomenology -- 11.2 Atmospheres -- 11.3 Effect of Flow on the Particles -- 11.4 Effect of Particles on the Flow -- 11.5 Particle-Wall Interaction -- 11.6 Coupling with Ablation -- 11.7 Discussion -- Chapter 12 Testing and Specific Test Facilities -- 12.1 Models Used in Reentry -- 12.2 Plasma Jets -- 12.3 Radiative Facilities -- 12.4 Ablation Measurements -- References -- Chapter 13 An Example: Apollo -- 13.1 Thermal Protection Design Requirements -- 13.2 Avcoat Material -- 13.3 Pyrolysis and Gas Flow -- 13.4 Ablation -- 13.5 Radiation -- References -- Appendix A Approximate Solutions of Stefan–Maxwell Equation -- Appendix B Approximation of Thermodynamic Properties -- Appendix C System with Variable Elemental Composition -- Appendix D Homogenization of an Inhomogeneous Rough Surface -- Appendix E Mass Loss by Pyrolysis -- Appendix F Water in Phenolic Composite Materials -- Appendix G Radiative Transfer in a Plane Interface of Silica -- Reference -- Index -- Supplemental Materials.
