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Autore	Logan Bruce E
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heat dispersion laws; 4.5 Transport relative to moving coordinate systems; 4.6 Simplified forms of the constitutive transport equation; 4.7 The constitutive transport equation in cylindrical and spherical coordinates; 5. Concentration Profiles And Chemical Fluxes; 5.1 Introduction; 5.2 The three theories of mass transport 5.3 Mass transport in radial and cylindrical coordinates using shell balances 6. Mass Transport Correlations: From Theory To Empiricism; 6.1 Definition of a mass transport coefficient; 6.2 The three theories; 6.3 Multiple resistances during interphase mass transport; 6.4 Correlations for mass transport coefficients; 6.5 Transport to spheres; 7. Transport In Sheared Reactors; 7.1 Introduction; 7.2 Fluid shear and turbulence; 7.3 Mass transport in steady sheared fluids; 7.4 Mass transport in turbulent sheared fluids; 7.5 Shear rates in mixed reactors; 7.6 Chemical transport in bubbled reactors 8. Suspended Unattached And Aggregated Microorganisms 8.1 Introduction; 8.2 Chemical transport to cells at rest; 8.3 Effect of fluid motion on microorganisms; 8.4 Transport to microbial aggregates; 8.5 Effectiveness factors for mass transport; 8.6 Relative uptake factors for mass transport; 9. Biofilms; 9.1 Introduction; 9.2 Transport in the fluid layer above a biofilm; 9.3 Biofilm kinetics; 9.4 Modeling completely mixed biofilm reactors: rotating biological contactors; 9.5 Modeling plug flow biofilm reactors: packed beds; 9.6 Modeling wetted wall biofilm reactors: trickling filters 9.7 Electrogenic biofilms 10. Dispersion; 10.1 Introduction; 10.2 Averaging properties to derive dispersion coefficients in turbulent fluids; 10.3 Dispersion in nonbounded turbulent sheared fluids; 10.4 Longitudinal dispersion coefficients for defined systems; 10.5 Dispersion in porous media; 11. Rivers, Lakes, And Oceans; 11.1 Introduction; 11.2 Chemical transport in rivers; 11.3 Mixing in lakes; 11.4 Mixing in estuaries; 11.5 Mixing in the ocean; 11.6 Transport of chemicals present as pure phases; 12. Chemical Transport In Porous Media; 12.1 Introduction; 12.2 Porous media hydraulics 12.3 Contaminant transport of conservative tracers

Sommario/riassunto

A unique approach to the challenges of complex environmental systems Environmental Transport Processes, Second Edition provides much-needed guidance on mass transfer principles in environmental engineering. It focuses on working with uncontrolled conditions involving biological and physical systems, offering examples from diverse fields, including mass transport, kinetics, wastewater treatment, and unit processes. This new edition is fully revised and updated, incorporating modern approaches and practice problems at the end of chapters, making the Second Edition more concise, accessible