

1. Record Nr.	UNINA9910765706703321
Titolo	Flow and heat or mass transfer in the chemical process industry // edited by Dimitrios V. Papavassiliou, Quoc T. Nguyen
Pubbl/distr/stampa	Basel, Switzerland : , : MDPI, , [2018] ©2018
ISBN	3-03897-239-8
Descrizione fisica	1 online resource (214 pages) : illustrations
Disciplina	660.28423
Soggetti	Mass transfer
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	About the Special Issue Editors . vii -- Dimitrios V. Papavassiliou and Quoc Nguyen Flow and Heat or Mass Transfer in the Chemical Process Industry Reprinted from: Fluids 2018, 3, 61, doi: 10.3390/fluids3030061 1 -- Athanasios G. Kanaris and Aikaterini A. Mouza Design of a Novel -Mixer Reprinted from: Fluids 2018, 3, 10, doi: 10.3390/fluids3010010 4 -- Cortes Williams III, Olufemi E. Kadri, Roman S. Voronov and Vassilios I. Sikavitsas Time-Dependent Shear Stress Distributions during Extended Flow Perfusion Culture of Bone Tissue Engineered Constructs Reprinted from: Fluids 2018, 3, 25, doi: 10.3390/fluids3020025 15 -- Agathoklis D. Passos, Dimitris Tziafas, Aikaterini A. Mouza and Spiros V. Paras Computational Modelling for Efficient Transdental Drug Delivery Reprinted from: Fluids 2018, 3, 4, doi: 10.3390/fluids3010004 . 29 -- Sarvenaz Sobhansarbandi, Lizon Maharjan, Babak Fahimi and Fatemeh Hassanipour Thermal Fluid Analysis of Cold Plasma Methane Reformer Reprinted from: Fluids 2018, 3, 31, doi: 10.3390/fluids3020031 46 -- Hai M. Duong, Ziyang Colin Xie, Koh Hong Wei, Ng Gek Nian, Kenneth Tan, Hong Jie Lim, An Hua Li, Ka-Shing Chung and Wen Zhen Lim Thermal Jacket Design Using Cellulose Aerogels for Heat Insulation Application of Water Bottles Reprinted from: Fluids 2017, 2, 64, doi: 10.3390/fluids2040064 64 -- Chrysafenia P. Koutsou, Anastasios J. Karabelas and Margaritis Kostoglou Fluid Dynamics and Mass Transfer in Spacer-Filled Membrane Channels: Effect of Uniform Channel-Gap Reduction

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#### Sommario/riassunto

Flow through process equipment in a chemical or manufacturing plant (e.g., heat exchangers, reactors, catalyst regeneration units, separation units, pumps, pipes, smoke stacks, et cetera) is usually coupled with heat and/or mass transfer. Rigorous investigation of this coupling of momentum, heat, and mass transfer is not only important for the practice of designing process equipment, but is also important for improving our overall theoretical understanding of transfer phenomena. While generalizations and empiricisms, like the concept of the heat transfer coefficient or the widely used Reynolds analogy in turbulence, or the use of empirical transfer equations for flow in separation towers and reactors packed with porous media, have served practical needs in prior decades, such empiricisms can now be revised or altogether replaced by bringing modern experimental and computational tools to bear in understanding the interplay between flow and transfer. The patterns of flow play a critical role in enhancing the transfer of heat and mass. Typical examples are the coherent flow structures in turbulent boundary layers, which are responsible for turbulent transfer and mixing in a heat exchanger and for dispersion from a smoke stack, and the flow patterns that are a function of the configuration of a porous medium and are responsible for transfer in a fixed bed reactor or a fluid bed regenerator unit. The goal of this Special Issue is to be a forum for recent developments in theory, state-of-the-art experiments and computations on the interactions between flow and transfer in single and multi-phase flow, and from small scales to large scales, which can be important for the design of equipment in a chemical processing plant.

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