

Preface

The purpose of this Volume, entitled “Composite Materials and Technologies Based on Mass Transfer Phenomena”, is to provide a collection of recent contributions in the field of transport phenomena in new and current materials. New advanced materials offer opportunities to change the way in which we see the engineering. They give added value in terms of increased performance and functionality. The reduction of carbon footprint can start at the production phase, where energy efficient processes can be developed and waste or recycled materials can be employed. The purpose of this volume is to provide a collection of recent trends, developments, and applications of novel materials, namely, nontoxic material; ecological materials; green and nanomaterials; service life prediction and durability; new advanced materials and their characterization, manufacturing, and application; and so forth.

It includes a set of new developments in the field of basic and applied research work on the physical and chemical aspects of transport phenomena, as well as related material properties and their measurements. This volume includes theoretical, numerical and experimental developments, providing a self-contained major reference that is appealing to both the scientists and the engineers.

The topics that will be presented in this Volume will be going to the encounter of a variety of scientific and engineering disciplines, such as chemical, civil, agricultural, mechanical engineering, etc. The book is divided 7 chapters that intend to be a resume of the current state of knowledge for benefit of professional colleagues, scientists, students, practitioners, lecturers and other interested parties to network.

In Chapter 1, Costa Melo and Barbosa de Lima provides information in the area of vegetable fiber-reinforced polymer composites. It includes discussion about definition and classification of the composites and their constituents, composite manufacturing process and current application in different industrial sectors. In Chapter 2, Nascimento Santos *et al.* focuses on the manufacturing of polymer composites reinforced by synthetic fiber with emphasis to the resin transfer molding technique (RTM). The study confirms RTM technique as a highly efficient process as compared with other manufacturing techniques of polymer composites. This is followed by Chapter 3, by Ferreira Tomaz *et al.* who presents, discuss and analyse the importance of membrane technology for human health. In Chapter 4, Lucena Lira *et al.* presents a development and characterization of tubular ceramic membranes using in their composition inorganic residues generated in the industries, such as, granite, alumina residue from calcination process and kaolin. In Chapter 5, Santos Filho *et al.* presents influence of additives on hybrids membranes morphology for water treatment. In this chapter polyamide 6 membranes and hybrids with 1, 3 and 5% of montmorillonite clay were obtained, adding potassium chloride and calcium chloride. This is followed by Chapter 6, by Araújo Mota *et al.* who presents an approach of different types of smart materials and their classification according to the material’s nature (fluid, ceramic, polymeric and metallic). Emphasis is given to the theoretical study of the metallic materials with shape memory, presenting the fundamentals, crystallographic study and the mathematical methods of phase transformation. Finally, in Chapter 7, Paula and Delgado present a hygrothermal analysis, reflected on the thermal comfort and night time ventilation in Brazilian gypsum plaster houses. This analyse was based on the adaptive model described in ASHRAE 55 and ISO 7730 standards for the evaluation of thermal comfort.

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