

Mechanical Engineering Series

Malay K. Das · Partha Pratim Mukherjee · K. Muralidhar

Modeling Transport Phenomena in Porous Media with Applications

This book is an ensemble of six major chapters, an introduction, and a closure on modeling transport phenomena in porous media with applications. Two of the six chapters explain the underlying theories, whereas the rest focus on new applications. Porous media transport is essentially a multi-scale process. Accordingly, the related theory described in the second and third chapters covers both continuum- and meso-scale phenomena. Examining the continuum formulation imparts rigor to the empirical porous media models, while the mesoscopic model focuses on the physical processes within the pores. Porous media models are discussed in the context of a few important engineering applications. These include biomedical problems, gas hydrate reservoirs, regenerators, and fuel cells. The discussion reveals the strengths and weaknesses of existing models as well as future research directions.

- Provides readers a state-of-the-art understanding of the theory of transport in porous media;
- Combines theories at varying length scales and connects theory with applications;
- Considers perspectives beneficial for both industry and academia;
- Sheds light on future directions in emerging technologies.

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