Chapter 4
Conclusions and Outlook

This is a relatively early book addressing the modern field of nanotechnology from a chemical engineering point of view. It tries to follow the route adopted in the last few decades from chemical technology to chemical engineering. This is taking specifically the descriptive principle of technology to the quantitative principles of engineering. This is achieved using mainly material and energy balances coupled to quantitative rates of processes such as rates of reactions: mass transfer, heat transfer, etc., in terms of state variables, e.g., concentrations, temperatures.

An integrated system approach (ISA) based on system theory (ST) is used which is the best approach organizing the optimal route for the design, analysis and research of such complicated, sensitive and high-quality systems. Mathematical modeling coupled to experimental results is coupled to address these relatively complex heterogeneous systems. Special examples are addressed such as the production of carbon nanotubes (CNTs) in catalytic bubbling fluidized beds for chemical vapor deposition (CVD).

This book should be useful for chemical engineers wanting to get into the field of nanotechnology using chemical engineering principles and to develop it into nanoengineering. It can also be useful for nanotechnologists wanting to develop into nanoengineers and learning chemical engineering principles to do that. It should also be useful to support multi-disciplinary (MD) research and applications in this important, critical and vital modern field.

Last but not least, this book should be useful for expanding and completing this process of transforming nanotechnology to nanoengineering and assisting in the development of more advanced and comprehensive work in this crucial field, coupling in an optimal manner, mathematical modeling and experimental exploration and verification of the models to be reliable design and research tools.

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