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Special Issue Reprint

Production of Biofuels and Numerical Modeling of Chemical Combustion Systems

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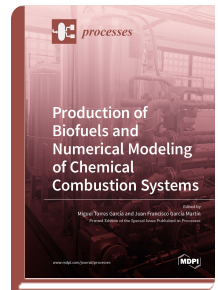
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Biofuels have recently attracted a lot of attention, mainly as alternative fuels for applications in energy generation and transportation. The utilization of biofuels in such controlled combustion processes has the great advantage of not depleting the limited resources of fossil fuels while leading to emissions of greenhouse gases and smoke particles similar to those of fossil fuels. On the other hand, a vast amount of biofuels are subjected to combustion in small-scale processes, such as for heating and cooking in residential dwellings, as well as in agricultural operations, such as crop residue removal and land clearing. In addition, large amounts of biomass are consumed annually during forest and savanna fires in many parts of the world. These types of burning processes are typically uncontrolled and unregulated. Consequently, the emissions from these processes may be larger compared to industrial-type operations. Aside from direct effects on human health, especially due to a sizeable fraction of the smoke emissions remaining inside residential homes, the smoke particles and gases released from uncontrolled biofuel combustion impose significant effects on the regional and global climate. Estimates have shown the majority of carbonaceous airborne particulate matter to be derived from the combustion of biofuels and biomass.

“Production of Biofuels and Numerical Modelling of Chemical Combustion Systems” comprehensively overviews and includes in-depth technical research papers addressing recent progress in biofuel production and combustion processes. To be specific, this book contains sixteen high-quality studies (fifteen research papers and one review paper) addressing techniques and methods for bioenergy and biofuel production as well as challenges in the broad area of process modelling and control in combustion processes.

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