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Editorial

Chemical Reaction Engineering: An Essential Approach towards Sustainable Technology Development

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Editorial

Chemical Reaction Engineering (CRE) is a specific part of the chemical engineering and technology including reactors, catalysts and chemical reactions. In more particular approach, it deals with the chemical reaction schemes catalytic such as photocatalysts, heterogeneous and homogeneous or non-catalytic and convertor i.e. slurry bed, fluidized bed, fixed bed, structured reactors or micro-channel where raw material contorted in to preferred products. Thus, the chemical reaction engineering is the core of chemical operation industry. The entire process sustainability and efficiency proceed around the performance of reactor or catalyst. Hence, the chemical reaction engineering is a particular engineering activity highlighting on successful operation and design of chemical reactors and associated with the development of chemical reactions on laboratory to commercial level. Now chemical reaction engineering analysts/ scholars are playing noteworthy role in rising future technologies with solid footprints of Efficacy, sustainability and energy efficiency by growing robust reactor designs and custom made catalysts (selective and highly active).

The main intention of chemical reaction engineering is focused on the optimization and investigation of chemical reactions to accomplish most effective reactor performance and design, which involved the interactions of flow phenomena, reaction kinetics, heat and mass transfer. The reactor performance is likely to be associated to feed composition and reaction operating circumstances through the above-mentioned factors. Usually, it is applied to petrochemical areas and petroleum; however, with the aid of chemical engineering and reaction chemistry concepts, it could be employed to regions such as waste treatment, chemicals, nanoparticles in advanced materials, biochemical engineering, pharmaceuticals, microelectronics, renewable energy systems, living system, enzyme technology, sustainable development, prevention of environmental contamination as well as to optimize a diversity of reaction schemes through simulation and modeling methods.

Currently, it covers from molecular and fundamental scale chemistry to a variety of broad level chemical production schemes. Consequently, the recent study trend shows a variety of sub-zones in CRE to be centered. This particular concern aims to cover the extensive variety of research areas within the CRE. These include catalytic reaction engineering and catalysis, kinetics and pathways, Reactor design, nano-structured, Deactivation and catalyst activity, Multiphase reactors, Emerging reactor technologies, environmental problems reactor safety, environmental separation methods, Sustainable reaction engineering schemes, novel reaction, optimization and simulation of reaction system, reaction mechanism, optimization the reaction by modeling, Reaction monitoring and analysis, waste minimization and clean process approach, process engineering and environmental chemical reaction, hybrid and composite materials with advanced traits and applications in chemical reaction engineering, also have been comprehensively examined from laboratory to industry level. Bio-chemical reaction engineering is also a fascinating research zone. Photocatalytic reaction scheme is presently a very dynamic and economical research zone within CRE, and papers from this zone are mostly promoted.

This specific subject emphasizes variety of new trends and various research topics in reactor engineering and catalysis. It covers catalystsynthesis and design, performance and physiochemical properties of catalyst, catalyst deactivation and scale-up, cross coupling and reaction chemistry, kinetics reaction mechanisms, reactor operation and design, nano-technology, reactor performance analysis and modeling, micro reactors concept, novel reactor ideas as well as technology advancement. Issue contains communications, technical minutes, reviews and research articles from scientists/ authors across the world. These viewpoint articles will prove customized rector and structured catalyst, catalyst design, kinetic modeling of complex reactions schemes, study and dynamic state mathematical modeling of non-uniform multi-phase transport aspect, for fluidized bed, slurry bed, fixed bed and membrane reactors for ameliorating reactor performance and design relevant to industrial application. Important is to integrate chemical reaction engineering (basically rooted demonstration at all time scales) method with whole process optimization/advancement. The memo here is that complexity can be modeled and exploited through design inherently robust scheme for forthcoming sustainable technology developments and existing revamps.

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