

Environmental Sustainability and the Chemical Engineering Profession

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The discipline of chemical engineering has changed remarkably since its early days. Extensive process automation on the large scale and molecular scale understanding of chemical kinetics has led to process modifications and innovations in chemical process engineering. Chemical engineering has more recently embraced biomolecular engineering concepts to widen its scope. In all of this there is one underlying theme that has pervaded all of the developments in chemical engineering as a profession. That area is environmental sustainability. Whether it has to do with minimizing the overall footprints of chemical processes, conserving or modifying the feed stocks, or improving product selectivity the primary aim of all chemical engineers is to design processes with minimal environmental impacts. From feedstock selection to product manufacturing, recovery and waste recycling, chemical engineers are involved in every large scale operations in the chemical and petrochemical industrial processes. Chemical engineers bear the burden of making sure that their activities are environmentally acceptable even while improving the health and well being of all citizens.

It is unfortunate, however, that most of the present chemical engineering curricula do not place a great emphasis on inculcating the basic principles of environmental sustainability in our graduates. Accreditation agencies are working towards making the study of environmental sustainability a component of future programs. The introductory concepts of heat, momentum and mass balances, transport and thermodynamics, kinetics and reactor design should include topics on environmental sustainability. Every chemical engineering graduate should see the importance of environmental sustainability in their overall training.

This journal is a recent undertaking to bring together concepts that exemplify the modern aspects of chemical engineering. The entire process of converting chemical energy to produce useful products is one that connects energy to the environment. The interplay of thermodynamics, chemical kinetics, transport processes and process design is fundamental to the exploration of the energy-environment nexus.

Research in the areas of energy and environment is carried out by both academia and industry and supported by governmental funding agencies. Water reuse, air pollution, climate change, waste remediation, product recycling, and green engineering are all areas where chemical engineers play critical roles. Chemical engineers are actively involved in the modern developments in fracking to extract natural gas from shale formations which has fundamentally transformed the oil and gas industry. There remain many questions that involve environmental sustainability in fracking that require careful study and chemical engineers should be at the forefront. Thus, environmental sustainability should be a major focus of this journal. Papers that emphasize the relationship between process design and environmental sustainability should receive particular emphasis in this journal. These papers should set this journal apart from other journals in the field.

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