A New Paradigm for Chemical Engineering?

One of the major concerns facing the world today arises from increasing industrial activities that have lead to rapid depletion of non-renewable resources and increase in pollution. With the current emphasis on sustainability, much improvement is expected from the process industry to minimize raw material, energy usage and waste generation without compromising the economic value of the enterprise. Responding to these challenges requires a new insight into the characteristics of a sustainable system, for example, how to incorporate the product, the process and the related supply chain within the system boundary under investigation? A fundamental rethinking of how to identify the needed chemicals based products and how to design, build and operate the corresponding production units, is necessary. Indeed, the chemical industry today is changed from the chemical industry of forty years ago. Clear evidence of this change comes from the jobs taken by graduating chemical engineering professionals in North America, Europe, and some of the Asian countries. In terms of where the graduating chemical engineers are going to work, a clear shift from the commodity chemical industry to the product oriented businesses has been observed. There is an increasing trend within the chemical industry to focus on products and the sustainable processes that can make them. Do these changes point to a paradigm shift in chemical engineering as a discipline? Historically, two previous paradigm shifts in chemical engineering corresponded to major shifts in chemical engineering as a discipline, which affected not only the education of chemical engineers, but also the development of chemical engineering as a discipline. Has the time come for a new paradigm shift that will prepare the current and future chemical engineering graduates to tackle the complex problems facing the chemicals based industries and serve the modern society more efficiently? The lecture will review the current status of chemical engineering as a discipline, the proposals for the third paradigm, the need for such a paradigm shift and related educational issues.

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