

学术报告

Process Systems Engineering for Sustainable Development



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Abstract:

How to improve the triple bottom line (economic, environment, societal) performance of chemical/energy production systems is a major challenge and opportunity for process systems engineers. From design point of view, due to the multi-dimensional feature of sustainability, how to account for the impacts of various factors and the cause-and-effect relationships can be very difficult. During process design stage, an enhanced process inherent safety index will be introduced. A design for sustainability and sustainability root cause analysis method will be presented, which is able to help the engineers focus the attention on the most important fundamental causes, discover opportunities for sustainability improvement and provide critical guidance.

Process dynamics play a key role during the operation stage. Profitable pollution prevention (P3) technologies seek the simultaneous realization of waste reduction and production improvement. It can be realized through fundamental understanding of the process operation and waste generation mechanism. An array of profitable pollution prevention technologies, including clean combustion technologies, recycle and reuse strategies for the petrochemical and electroplating technologies will be reported. Process safety analysis and enhancement strategies based on process dynamics will be introduced. This method has been applied to the design of syngas-platform chemical conversion technologies and water desalination technologies.

Biography:

Helen H. Lou is a Professor in the Dan F. Smith Department of Chemical Engineering, Lamar University, USA. Her research focuses on sustainable engineering, process systems engineering and combustion. Dr. Lou was the Chair of AIChE Sustainable Engineering Forum (SEF) in 2010-11. Currently, she serves as a Director of AIChE Fuel and Petrochemicals Division. She is also an Editorial Board Member of Journal of Environmental Progress and Sustainable Energy. She was honored as the University Scholar in 2009, University Professor and Ann Die Hasselmo Scholar in 2013, and received the AIChE SEF Education Award in 2014. She obtained her B.S. degree in Chemical Engineering from Zhejiang University in 1993, then worked four years in SinoPec Luoyang Petrochemical Engineering Corporation (LPEC). She received the following degrees from Wayne State University: an M.S. in Chemical Engineering (1998), an M.A. in Computer Science (2001) and a Ph.D. in Chemical Engineering (2001).