

Editorial



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Game Changing Innovation in Chemical Production Methods, Concepts & Examples

This special issue dealing with game changing innovations in chemical production has been compiled by the Division of Industrial and Applied Chemistry (DIAC). The DIAC is a forum for chemists, chemical engineers and process engineers interested in industrial chemistry, chemical production, development and related fields. Our goal is to promote industrial chemistry and chemical process technology in all fields of chemical development and production. We want to highlight the importance of chemical production and process development and provide a network for knowledge transfer and discussion and for interdisciplinary collaborations.

The Swiss chemical industry needs to continuously innovate to maintain the competitiveness of its chemical production in Switzerland. But what does the term game changing really mean? One would expect fundamentally new chemical processes or manufacturing approaches. Game changing processes in the chemical industry usually require new plants, for which the investment must yield an acceptable payback. Often this cannot be achieved and then companies prefer to further optimize their existing process technology.

The game changers in this issue rather lie in the combination of efficiency improvement methods of manufacturing processes with the recent advancements in data mining and digitalization.

The first article from Roche describes the many aspects that need to be taken into account when designing a new multi-product plant for batch production of highly active pharma ingredients.

Many processes who have started out at batch processes are later transformed to a conti-process. Granulation is one of the operations that is preferably done in batch. Scientists from the University of Düsseldorf and Novartis have studied the critical process parameters of granulation processes that enable the fast development of a continuous granulation process.

Increasing process safety and product quality requirements in the chemical production require a very low error rate. As many automated plants still require interventions by operators, the human factor still plays a major role. Lonza describes new training concepts to improve the technical understanding and reduce human error.

Manufacturing Execution Systems (MES) are located at the interface between ERP-Systems and the production control systems. The Syngenta article shows some recent examples where Manufacturing Execution Systems have been used to optimize plant utilization and yield.

Modern data mining techniques help to maximize the use of the data generated by the production control systems. Clariant describes in its article how data mining can be used for automated process optimization and the prediction of future states of production processes.

When data-based process optimization is performed on every level from product development to production, production planning and logistics, and these processes are all linked, we speak of vertical integration. Vertical integration is one of the main pillars of Industry 4.0 which is the so-called 'next big thing' also for the chemical industry. In an article from DSM we can learn how Industry 4.0 could become reality *via* an evolutionary rather than a revolutionary process. We will surely hear more of this topic in the years to come.

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