

Process Integration for Resource Conservation

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Process integration is defined as “a holistic approach to design and operation that emphasizes the unity of the process”. The underlying philosophy for process integration is the setting of performance targets. After four decades of development, various graphical, mathematical programming and hybrid tools have been developed to address the common problems in the process industry, such as energy conservation, water and solvent recycling, hydrogen integration, and more recently carbon footprint reduction. These tools are now relatively matured and may be found in review, textbooks, industrial handbook and encyclopaedia chapters.

In this talk, some success stories for the application of process integration will be shared. One of the example involves a water minimisation study for a polylactide (PLA) production process. The latter is among the industrial processes that is known for consuming high amount of water during its operation. The study was performed using mathematical programming based on superstructural approach. Different scenarios involving flowrate and cost minimisation, as well as profit maximisation were analysed to validate the technical and economic feasibility of the water network.

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