Simulation for a Plant-wide Optimization based on a Sensitivity Analysis using Aspen Plus

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A plant-wide optimization simultaneously considering a compressor, a heat exchanger, an absorber and a distillation column is performed with a simulation program, Aspen Plus 11.1. While the existing optimization has been performed by focusing on a unit process in a plant, this study optimizes the whole processes in a plant to find the globally optimal operating condition. As a case study, a PTA (Purified Terephthalic Acid) process is considered. To find the maximal PTA production rate allowed for the process, the process is modeled with the simulator as a first step. In the modeling, the reaction mechanisms based on a statistical data analysis are used to examine the propagation effects of feed change on the load of each unit process. The optimization is based on a sensitivity analysis of the effects. With the results of the sensitivity analysis, the most proper feed increase ensuring a safely of the plant is determined. Furthermore, the optimum operating condition can be found out from the results. The information obtained from the simulation will be effectively used for the optimization of the actual PTA process.