Study on the provision of low temperature cooling in gas processing

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When designing a cooling process for low temperature (about -30℃ or less), multi-stage refrigeration cycle is usually used. Increasing energy efficiency for the multi-stage refrigeration cycle can be made by introducing additional equipment, for example, vessel, heat exchanger, etc. Another design option to be considered is to introduce mixed refrigerants for the provision of low temperature cooling. In this study, we compared different configurations of refrigeration cycles by using a UniSim® to minimize the amount of energy requirement. Optimization was performed by the genetic algorithm (GA) provided in MATLAB® after linking MATLAB® and UniSim®. Case study presents techno-economic analysis of refrigeration cycles considered in this study and illustrates how different configuration of refrigeration cycle influences energy efficiency and economics.

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