Multi-objective optimization of gasoline synthesis process for economic profit and CO_2 emissions

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Recently the global warming issue getting attention, CO_2 utilization has been receiving great attention. Especially, reforming is considered as a great method of CO_2 utilization. By converting CO_2 to syngas, various further reactions can be achieved like methanol synthesis. And also, methanol can be reactants of various substances like di-methyl-ether (DME). CO_2 is also consumed during the reforming but CO_2 emission also occur when using energy like heating, compressing, etc. Therefore, when designing a process, consideration should be given not only to the overall benefits of the process, but also to the CO_2 that can be generated from multiple utilities. In this research, the process of synthesizing gasoline from CH_4, CO_2 and H_2O was designed and multi-objective optimization of gasoline synthesis process for economic profit and CO_2 emissions was conducted. Since there was a trade-off between the economic profit and CO2 emissions, the pareto optimal was searched.