

Feasibility study of methanol production by utilizing off-gases from iron and steel making plants

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Off-gases from iron and steel making plants are mostly supplied to a combined heat and power cycle (CHP) system as a fuel to generate power and heat, which are generally used within the plants. However, it is of great interest to utilize these gases to generate more valuable products instead of converting to heat and power. In this regard, a feasibility study has been conducted to produce methanol using these gases with a commercial simulator ASPEN PLUS. Methanol can be used as energy storage molecules, transportation fuels, and raw materials for synthetic hydrocarbons. For methanol synthesis from off-gases, we first make a syngas( $H_2$ , CO), which is made by separating  $CO_2$  from the off-gases. In this study, a chemical absorption technology with monoethanolamine(MEA) was adopted to separate  $CO_2$ . And conversion of syngas to methanol was conducted with a conventional Imperial Chemical Industries (ICI) process. Heat integration was carried out for minimizing energy requirements for a whole process. Economic evaluation was also performed to compare the unit production cost of methanol obtained from this model with the existing one.