CO₂ valorization in GasPOx

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Partial oxidation of natural gas (GasPOx) is a common technology for generation of syngas [1]. It is a non-catalytic exothermic process applying steam and oxygen as oxidizing agent and can be operated at high pressures to reduce the plant size and meet the demands for subsequent syngas utilization. Partial oxidation of natural gas follows the global reaction (1) while also comprising steam reforming and dry reforming reactions.

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CH_4 + \frac{1}{2}O_2 \rightarrow CO + 2 \text{H}_2
\] (1)

When CO₂ is available at the plant site, addition of CO₂ to the gasification process can present a valuable means to mitigate CO₂ emissions and influence the H₂/CO ratio of the syngas while additionally saving steam [2, 3]. This is of particular interest when a CO rich syngas is desired, e.g. for oxo-synthesis.

Results from a GasPOx test campaign in the HPPOx test plant in Freiberg are presented and evaluated in terms of conversion and syngas quality. The H₂/CO ratio can be adjusted between 1 and 1.8 by CO₂-addition. The amount of required oxygen per generated CO is considerably reduced. From the current findings it is possible to optimize the steam and oxygen requirement and predict syngas quality. This is a key issue in new GasPOx equipment design. Lurgi GasPOx technology proves to be suitable to efficiently convert CO₂ containing gas streams.

References

