Introduction

Landfill gas is produced by the anaerobic decomposition of biomass in landfills via:

\[ \text{CH}_4 + 0.5 \text{H}_2 \text{O} + 2 \text{CO} \rightarrow \text{CO}_2 + 2 \text{H}_2 + 200 \text{kJ/mol} \]

The landfill gas can be converted to synthetic natural gas via reaction 1.

\[ \text{CO} + \frac{1}{2} \text{O}_2 \rightarrow \text{CO}_2 + 283 \text{kJ/mol} \]

\[ \text{CO}_2 + \text{H}_2 \rightarrow \text{CO} + \text{H}_2\text{O} + 41 \text{kJ/mol} \]

\[ \text{H}_2 + \frac{1}{2} \text{O}_2 \rightarrow \text{H}_2\text{O} + 286 \text{kJ/mol} \]

Materials and methods

\[ \text{CO}_2 + \text{H}_2 \rightarrow \text{CO} + \text{H}_2\text{O} + 41 \text{kJ/mol} \]

Conclusions

1. Rb\(\text{Al}_{2}\text{O}_{3}\) catalyst reaches equilibrium conversions.
2. Reactions occurring during ATR are mostly sequential and well understood.
3. ATR can be used to control \(\text{H}_2/\text{CO}\) ratio of products.

Future Work

1. ATR kinetics
2. Determine the effect of poisonous gases commonly found in landfills on catalyst activity.
3. ATR reactions under different hydrocarbon oxide conditions.
4. Applicability to urban waste Streams.

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