

2-3 Developing Hydrogen Production from Coal by Separation Carbon Dioxide during Gasification (HyPr-RING)

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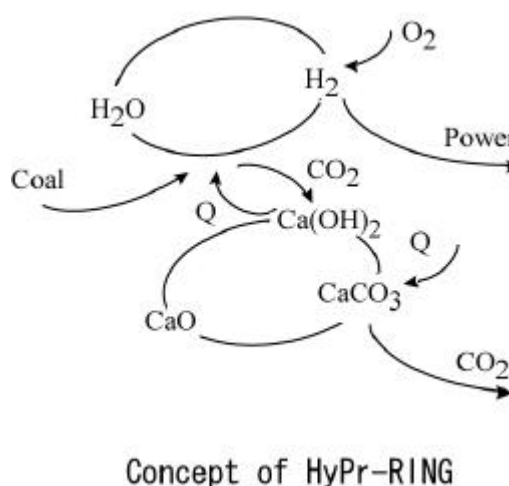
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Abstract:

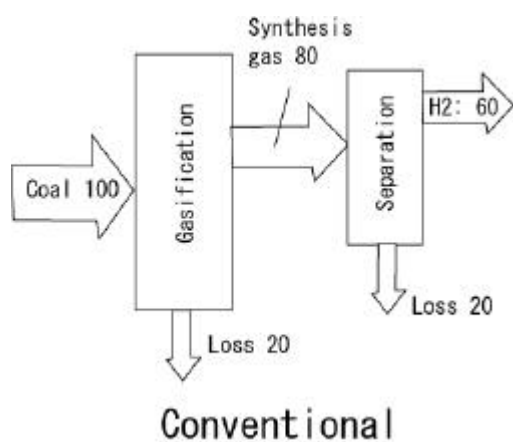
Using CaO as a sorbent to completely remove carbon oxides during hydrocarbon gasification for hydrogen production was studied in the pass few years. Four reactions was integrated in to one reactor (HyPr-RING method). ($CaO + H_2O \rightarrow Ca(OH)_2$, $C + H_2O \rightarrow CO + H_2$, $CO + H_2O \rightarrow CO_2 + H_2$, $Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$).

Experiments had confirmed that, when hydrocarbon, water and Ca(OH)₂ were set in a micro-autoclave, under temperature 973 K and pressure above 12 MPa, gas product was only hydrogen with a few methane. CO was converted to H₂, and CO₂ was absorbed by Ca(OH)₂ to formed CaCO₃ completely.

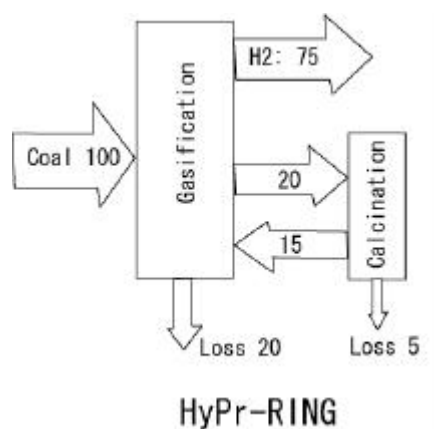
By calcination, CaCO₃ can reform to CaO again. Since the chemical energy contained in CaO can release during gasification, high hydrogen production efficiency is expected.



Concept of HyPr-RING



Conventional



HyPr-RING

Comparison of energy loss between conventional and HyPr-RING methods.