

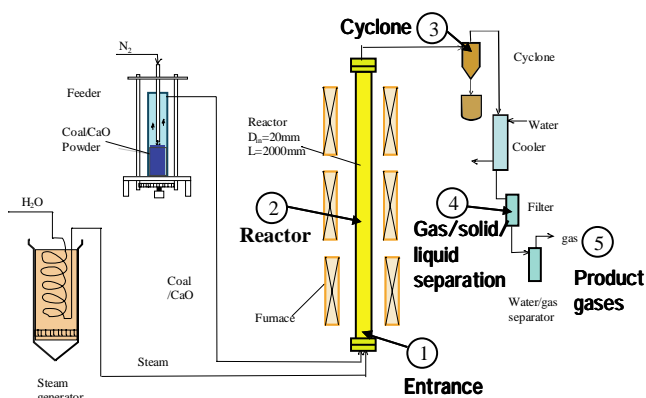
2 - 1 Development of a H₂ Production process from Coal with CO₂ internal removal in gasifier (HyPr-RING)

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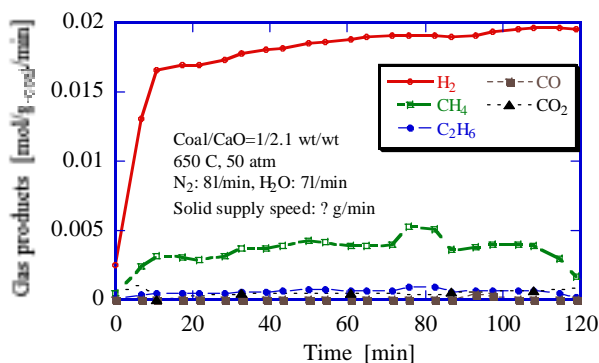
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Abstract:

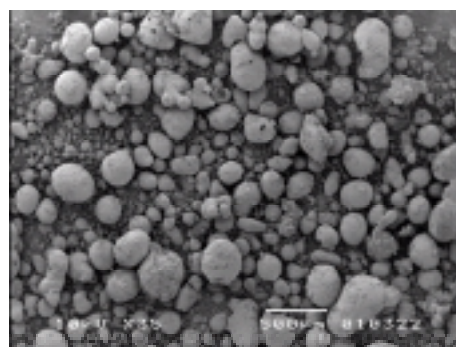
A continuous running flow type reactor was built, included feeder, reactor, cyclone, filter and product gas analyzer. Coal/CaO mixture was injected with high temperature and pressure steam into reactor. In the reactor coal and CaO reacted with steam and then CaO absorbed CO₂. After reaction, solid was collected by cyclone, and H₂O was separated with product gas by a filter. Product gas was continuously analyzed with a gas chromatograph. Experimental results show that, gas product was only hydrogen with a few methane. CO was converted to H₂, and CO₂ was absorbed by Ca(OH)₂ to form CaCO₃. Comparing with a result of coal only experiment, it is clear that tar was sharply reduced by CaO addition. H₂S and NH₃ also reduced in the product gas when CaO was injected with coal together. When CaO injected in reactor, CaO was first reacted with H₂O to form Ca(OH)₂ and then Ca(OH)₂ absorbed CO₂ to form CaCO₃.



Continuous running flow type reactor



Gas product from Taiheiyo coal



Solid residue in the reactor