Energetically Enhanced Reforming Process

Tech ID: 25869 / UC Case 2015-885-0

SUMMARY

UCLA researchers from the Department of Chemical and Biochemical Engineering have developed a method of generating hydrogen through steam reforming that does not require the large amounts of applied heat needed in conventional reforming processes.This presents the opportunity to greatly reduce operational costs associated with hydrogen generation.The method does not introduce air or oxygen to the reforming mixture, thereby avoiding the explosion hazard that is introduced by autothermal reforming.

BACKGROUND

Steam reforming of natural gas is currently the most economical method of producing large amounts of hydrogen. It involves combining natural gas with steam or carbon dioxide at high temperature. This process requires large endothermic heat loading. Uniform and energy-efficient heat load transfer is a major challenge.

INNOVATION

UCLA's method introduces large amounts of carbon monoxide and steam to the reformer feed.This enhances the exothermic portion of the reforming process, which produces heat that is used to sustain the endothermic reactions.In essence, UCLA's method substitutes energy input at the high-temperature phase of the reaction (~800C) with energy input at the low-temperature phase (~450C), thereby accommodating a greater variety of energy sources for the reaction, such as waste heat, concentrated solar power, and others that result in increased system efficiency.

ADVANTAGES

- Significant cost savings potential from the reduced energy input requirements.
- Applicable to a variety of substances being reformed or being used for reformation.
- Does not introduce oxygen to system, thereby avoiding the explosion risk associated with autothermal reforming.
- No air separation subsystem required.

STATE OF DEVELOPMENT

This technology is currently in the conceptual stage. Development is ongoing.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,329,149	06/25/2019	2015-885

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OTHER INFORMATION

KEYWORDS

Hydrogen, Reforming, Energy

CATEGORIZED AS

- **Energy**
  - Hydrogen

RELATED CASES

2015-885-0

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