



Principle and Justification

Hydrogen is an energy of the future with importance as its combustion will not cause CO₂ which will not create pollution to an environment. Hydrogen can be used as fuel either in cars or rockets including fuel cells. It is expected that in the future, fuel cells will take the significant role and widespread use. Therefore, the R&D on hydrogen to support using hydrogen as clean energy in replacing fossil fuels at present uses, is extremely important.

Producing the hydrogen by thermochemical process has a low cost comparing with other processes whereas it is capably produced at large quantity and easy to increase its production rate. Thus, it is feasible to develop for using at an industrial level. Besides, the raw materials using as fuel are available in Thailand. This project is such the R&D on producing hydrogen by thermochemical process for creating the knowledge and development on production technology to prepare the readiness for competition and utilisations in the future.

Project Objectives

To develop the knowledge and technology of producing hydrogen by thermochemical process. To develop and demonstrate the hydrogen production system by thermo-chemical process, and to study the methodology and safety requirement of its production system and storage used by such this process.

Test Result of Hydrogen Production System by Thermochemical Process

The hydrogen production system in this study project is a new development based on principle of pyrolysis-gasification process and utilising the heat from combustion. This would yield the high rate of product gas and low tar, which resulted in higher efficiency than general gasification systems. This adopted system applies the principle of circulating fluidisation by conductive material to transfer heat between part of system with combustion and part of system with gas generation (i.e. pyrolysis-gasification). Figure 1 shows the Flow Scheme of the Pyrolysis-Gasification Process whereas Figure 2 depicts the Reactor Developed for Hydrogen Production System by Thermochemical Process.

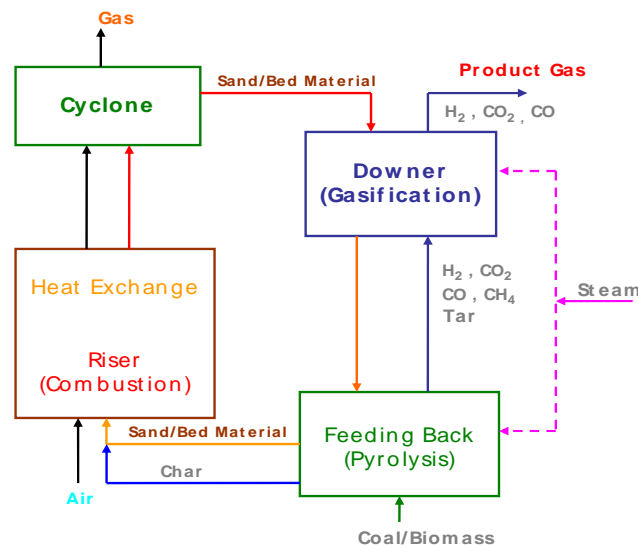


Figure 1: Flow Scheme of Pyrolysis-Gasification Process



Figure 2: the Reactor Developed for Hydrogen Production System by Thermochemical Process

It is found from the Study and Testing of Hydrogen Production System developed that, this system has the potential in producing fuel gas with a hydrogen proportion at average higher than 40 percent (as shown in Figure 3). Thus, it is appropriated to make a pure hydrogen for further utilisations. The demonstration system of this hydrogen production developed by DEDE, *the Department of Alternative Energy Development and Efficiency*, can be counted as **the first reactor** of hydrogen production by thermochemical process in Thailand. It capably adopts various raw materials, likewise biomass, available in the country for utilisation. This will be benefit to promote and create the industry of hydrogen and fuel cells in Thailand in the future.

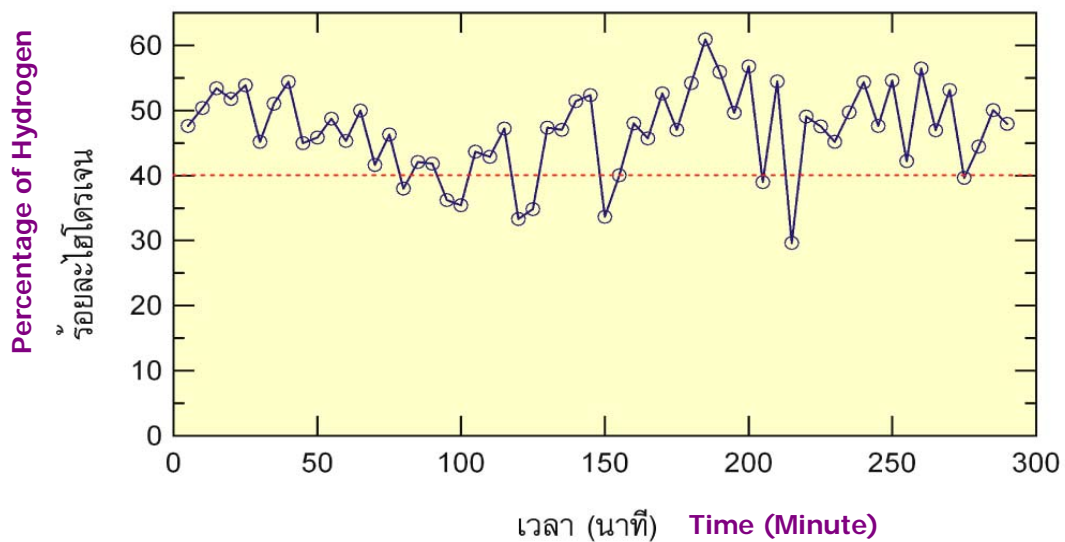


Figure 3: Percentage of Hydrogen Proportion in Product Gas