

- **Coal Gasification Technology Development for Fuel Cell feeding Gas Manufacturing**

1. Outline of Research and Survey

Coal is positioned as a core energy source to alternate petroleum energy in viewing from stabilized energy supply to Japan, for the reason that coal shares as much as about 16% of her total energy supply. However, in comparison with other fossil fuels, coal generates more amount of Global Warming material, CO², and then it is required for us to promote technology development to further improve its thermal efficiency.

In this regard, development of an Integrated coal Gasification Fuel Cell (IGFC) combined cycle power generation system has become much expected to be implemented because of its possible leap and bound improvement of thermal efficiency compared with conventional pulverized coal firing power generation. The system is to be a combination of Fuel Cell, Gas Turbine and Steam Turbine. However, there are many problems still remained to be solved such as scaling -up and reliability of the system.

Consequently, for solving those problems a research, which is composed of **a coal gasification furnace of 150t/day in coal treating capability**, as for its major installation, has been under implementation with a plan until fiscal 2006 by NEDO and Electric Power Development Company (EPDC). The research is being undertaken by means of the pilot plant testing facility of the EAGLE [coal Energy Applications for Gas, Liquid and Electricity] project.

2. Support / R & D (FY1998 to FY2006)

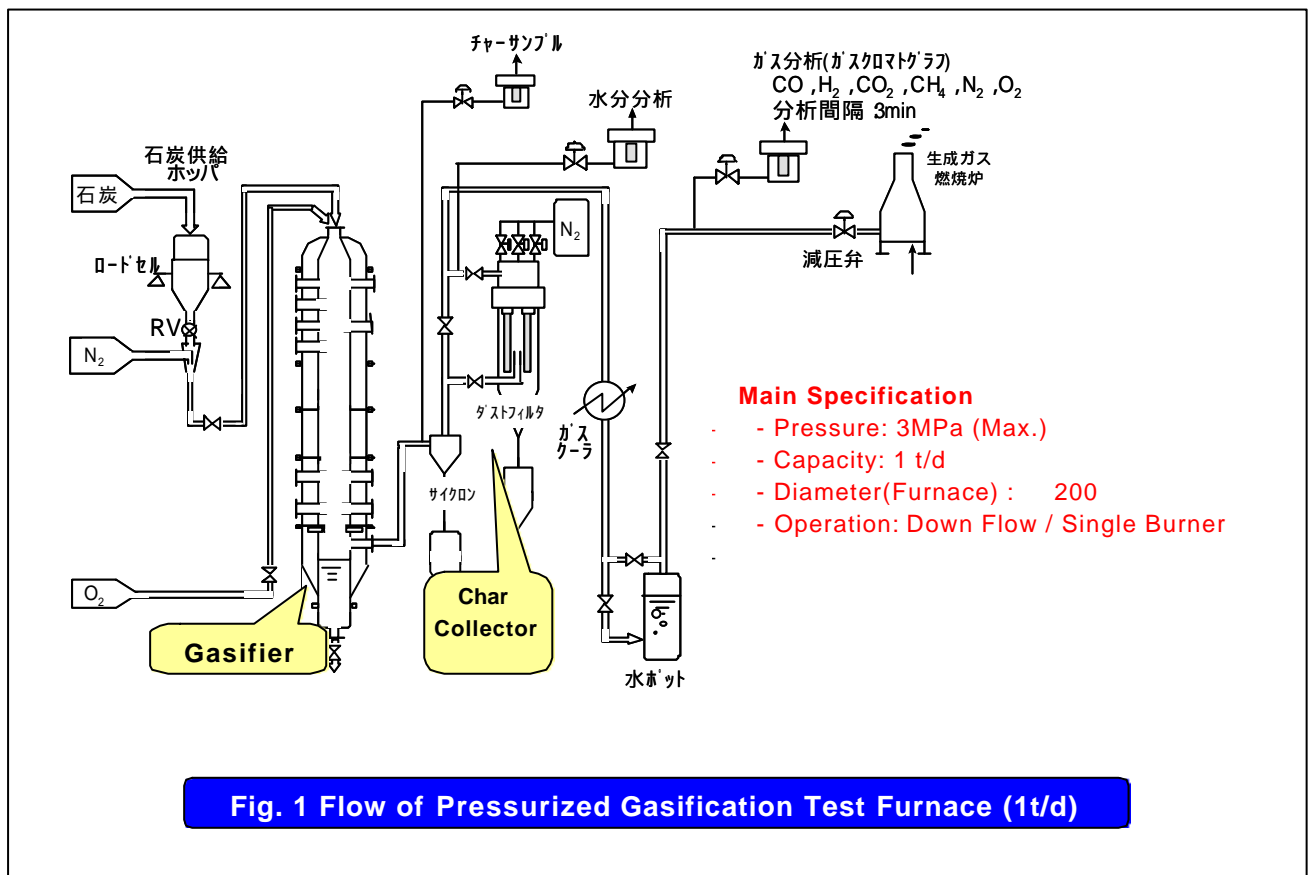
On the other hand, entrusted by NEDO, Center for Coal Utilization, Japan (CCUJ) has been undertaking the following Support/ R & D activities,

The purpose of the research is primarily **to support the projected studies run by the above-mentioned Pilot Plant testing facilities (EAGLE), and also to extract some practical matters for the possible uses in the future in order to check the upcoming countermeasures for them.** Contents of the research are introduced as follows,

- (1) Extraction of the Issues by a social adaptability survey on such Coal gasification technology as Fuel Cell using Coal Gas Manufacturing technology, etc. and Reviewing of their solving Countermeasures, together with Implementation of the related Feasibility Study
- (2) Supporting of the research at the pilot plant testing facility and Implementation of component studies for further improvement of thermal efficiency of the Coal Gasification

Fuel Cell combined cycle power generation system

- Evaluation of Gasification Characteristics of the candidate coal for the EAGLE project by using a 1 t/d pressurized gasification test facility
- Reviewing of efficiency improving countermeasures by the use of by-producing steam.
- Evaluation of Initial reaction speed of the gasification by means of a gasification basic reaction equipment (pressurized flash pyrolyzer)
- Drafting a calculation software for an entrained bed gasification process used by an EAGLE furnace
- Forecasting of the operation capability of an EAGLE furnace and its operation



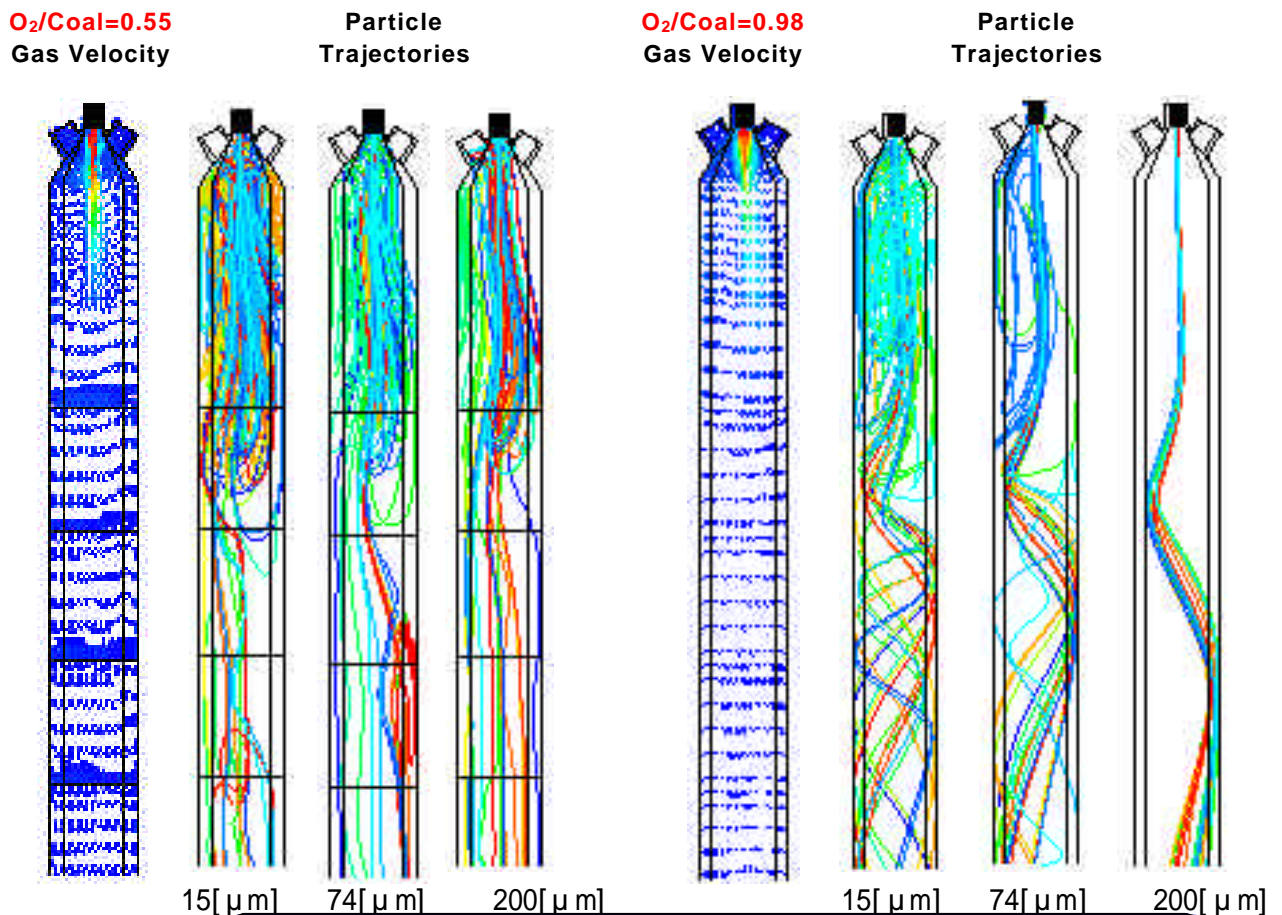
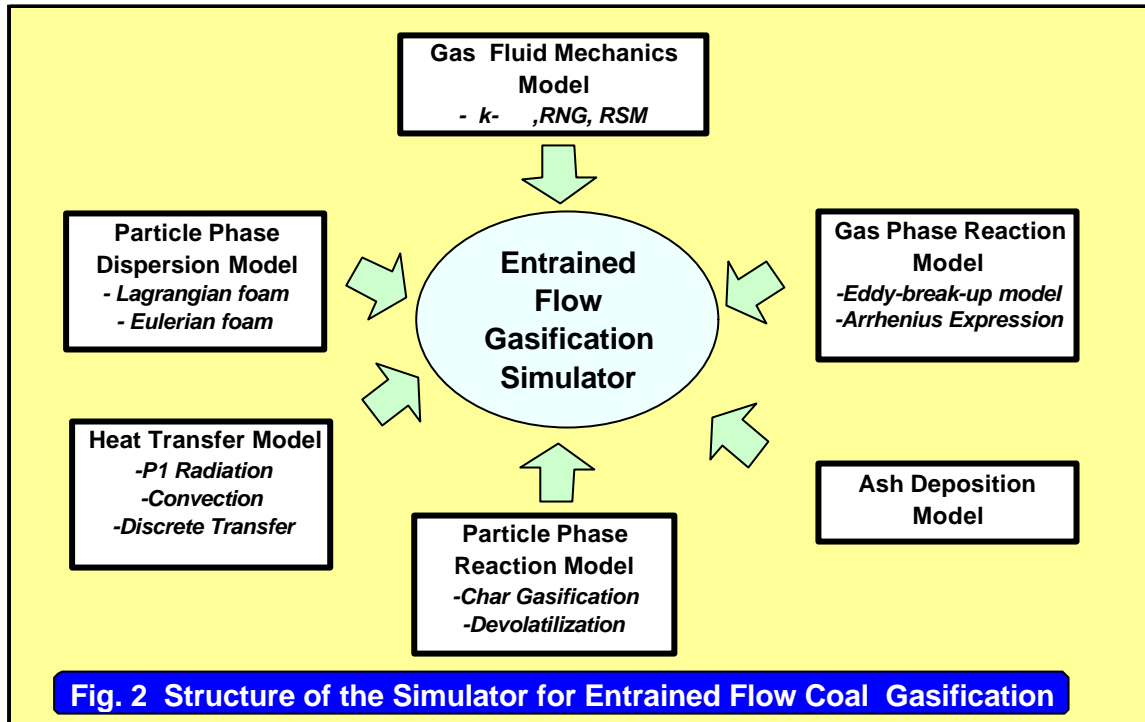


Fig.3 Results of Particle Phase Dispersion in 1/d Gasification Furnace

3. Cooperating Companies

- Babcock-Hitachi Company Limited
- Idemitsu Kosan Company Limited

4. Related Technical Paper

The following technical paper is available on this R & D. If you like to know this technology more, please click the following title of the paper to link it.

Supporting Studies on EAGLE Project