Development of Oxy-fuel IGCC system

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1. Introduction
In order to control CO2 emission, as countermeasure for a global warming problem, CCS (CO2 capture and storage) technology is studied in various countries, but CCS required great decrease of thermal efficiency. This project plans to develop innovative IGCC system with CO2 capture, which can keep generation efficiency more than 40%.

2. Proposed system
This system is to gasify coal with mixed gas of recycled CO2 from flue gas and necessary O2, just as Oxy-fuel combustion system [1].

3. Experimental confirmation (3TPD gasifier)

4. Numerical simulation & reaction analysis
CRIEPI's original numerical simulation code clarified the effect of high CO2 concentration on temperature profile inside a gasifier. When O2 concentration becomes higher, temperature drop inside gasifier will be cleared.

5. Development of countermeasure for carbon deposition in hot-gas cleanup system
Experimental data proved that addition of CO2, H2O(Steam), GT exhaust gas (mixture of CO2 and H2O) prevent carbon deposition.

5. Project update
- Increase of CO2 concentration reduced char production rate.
- Addition of CO2 and H2O prevented carbon deposition in hot gas cleanup system.

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References: