

Advanced Coal or Biomass Gasification Process Operates Under Less Severe Conditions

Proprietary oxygen carrier catalysts, chemical looping produces purer synthesis gas, lowers operating costs

Benefits

- Reduces plant costs
- Increases feed flexibility
- Obviates the need for slurry feeding of coal
- Eliminates cryogenic separation, increasing efficiency and reducing asset investment
- Allows for a much easier separation of CO₂, CO, and/or hydrogen generated due to little or no entrained nitrogen
- Reduces tarring of internal gasifier surfaces because of the distribution of oxygen carrier in the system

The Problem

Organizations in the coal gasification industry are always seeking to both increase the purity of coal-derived synthesis gas and lower production costs.

The Solution

Eltron Research & Development has developed a new approach to coal gasification technology that enables synthesis gas production under less severe operating temperatures and pressures. The novel approach results in purer synthesis gas and helps lower operating costs.

Eltron's new coal gasification technology combines two technologies:

- Chemical looping separation of oxygen from air
- A fluidized or moving bed gasifier

Our approach employs a metal oxide as an oxygen-carrier to separate oxygen from air. The metal oxide is then used as a fluidization medium to carry oxygen to the gasification zone and catalyze gasification reactions.

Eltron has identified inexpensive oxygen carrier materials and methods for imparting robustness to those materials. A bench-scale, switched feed fluidized bed reactor has been built to demonstrate the principles of chemical looping using these carriers for the gasification of coal, waste, and biomass. A mini-pilot plant utilizing the oxygen carriers and novel features is being designed and fabricated.

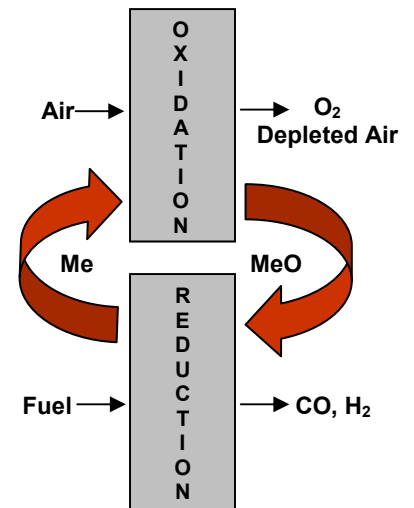


Diagram of chemical looping scheme for coal, biomass or other solid fuel gasification processes. Oxidation and reduction occur in the two fluidized bed reactors while a metal oxide serves as an oxygen carrier to separate oxygen from air.

Typical processes operate at 1,500°C, which can cause many material problems. Using Eltron's approach, chemical looping gasification at atmospheric pressure and a temperature between 550°C and 950°C has been accomplished.

Features and Benefits

The technology expands on Eltron's previous efforts to improve operational efficiency and reliability and to reduce capital investments for coal gasification. Our approach helps reduce overall operating expenses. Production at less severe operating temperatures and pressures requires less energy and minimizes material problems. The process allows for greater feed flexibility and eliminates slurry feeding of coal. And by eliminating the cryogenic air separation unit (ASU), Eltron's technology significantly increases efficiency and reduces costs.

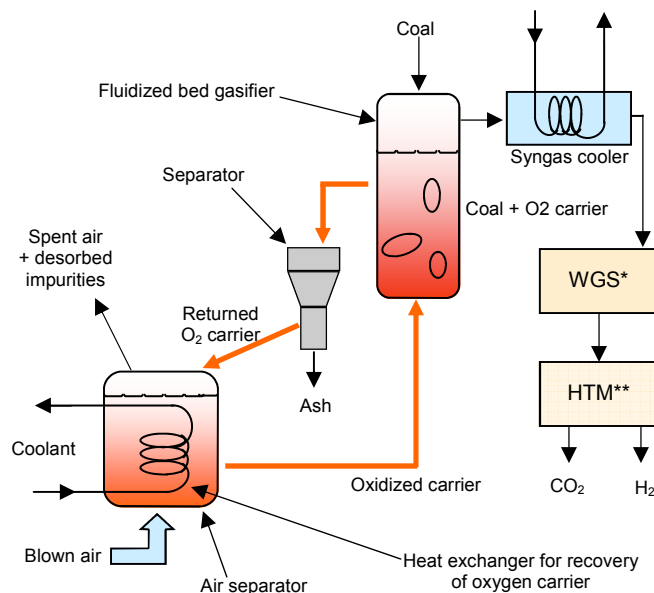
Another advantage is the fuel itself. Eltron's technology reduces impurity levels in the coal-derived synthesis gas. Unlike air-blown systems, chemical looping produces little or no entrained nitrogen, resulting in a concentrated product stream and allowing for much easier separation of CO₂, CO, and/or generated hydrogen. This separation leads to better distribution of the oxygen carrier in the system, which in turn reduces the tarring of internal gasifier surfaces.

Our new technology is also scaled for larger systems. The oxygen carrier can be combined with a fluidized bed or a moving bed reactor to produce a single assembly in which coal and oxygen carrier is fed – and syngas is produced.

Contact Us

To discuss the possibility of entering into a business relationship with Eltron, contact the Business Development Group at business@eltronresearch.com.

To learn more about Eltron Research & Development's gasification process and the many other technologies that the company is researching and commercializing, visit www.eltronresearch.com.



Schematic of Eltron's process concept that employs an oxygen carrier for oxygen separation and coal gasification.

*Water-gas shift

**Hydrogen transport membrane



Eltron Research & Development Inc.

Eltron Research & Development Inc. invents and commercializes novel technologies involving advanced materials, energy, water and environmental systems.