

A system for chemical looping syngas combustion and HCl adsorption

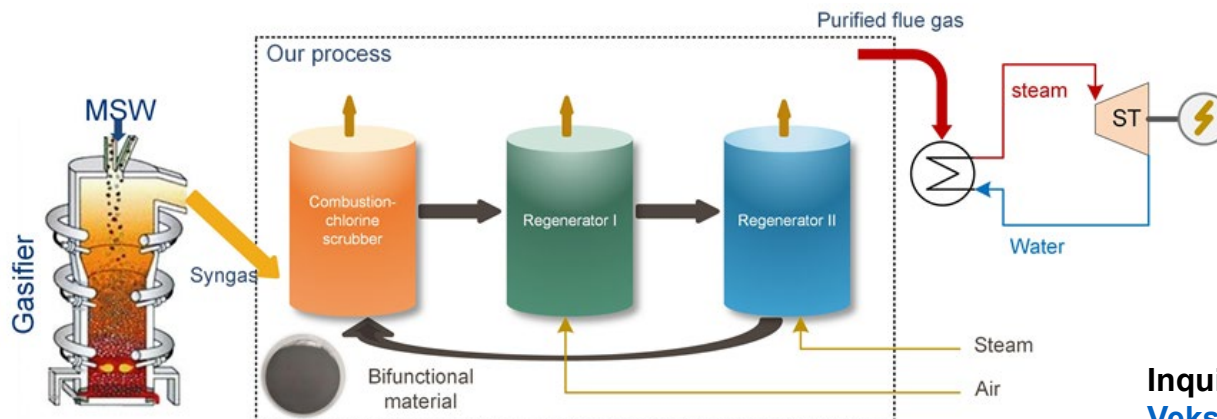
Overview

Combustion of syngas from waste and biomass gasifier for electricity production is an important waste-to-energy pathway.

Chlorine compounds, such as hydrogen chloride (HCl) and alkali metal chloride vapors, are common gaseous impurities causing severe corrosion of plant equipment, especially a steam boiler.

A process is developed for simultaneous syngas combustion and HCl removal from gas.

After the process, a clean high-temperature flue gas stream is produced for electricity generation through downstream heat recovery system.



Key features

- A bifunctional process for simultaneous syngas combustion and HCl removal from the gas products of waste and biomass gasifier.
- The process combusts almost all syngas ($\geq 99.9\%$), removes $\geq 90\%$ of HCl and $\geq 80\%$ of alkali metal chlorides.
- The bifunctional material is regenerable in line through cyclic chemical looping process.

Applications

- Conversion of raw syngas to clean flue gas for electricity production.
- Corrosion prevention for heat recovery system in waste-to-energy plant.
- Elevating steam parameters in the boiler for higher electricity generation efficiency.

Market opportunities

- Electricity generation from waste and biomass gasification.
- Waste recycling.

Advantages and benefits

- Saving cost for the maintenance of steam boiler from high-temperature corrosion.
- Concentrating CO_2 for carbon capture while processing N_2 -free syngas.

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