

Syngas: Clean syngas for energy and chemicals

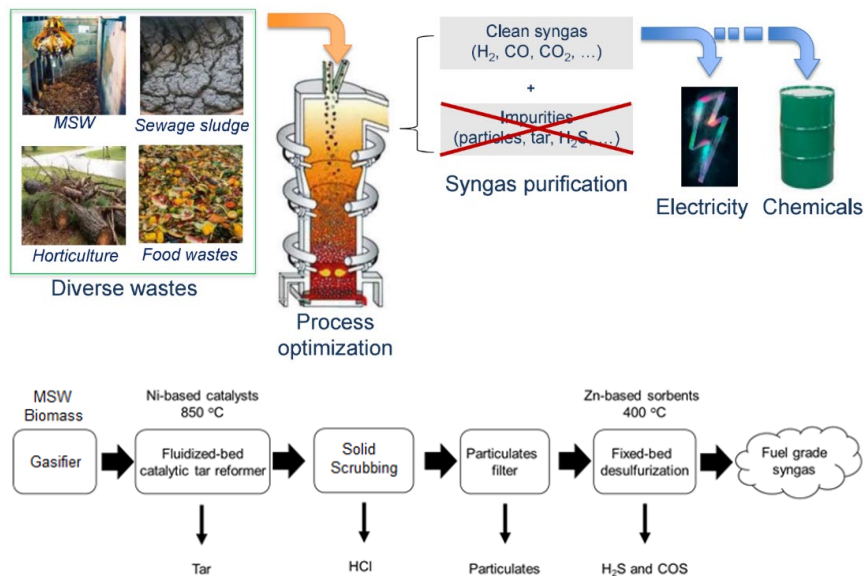
Overview

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

- The system is a high-temperature process and free from cooling and scrubbing with water and oil-based liquids that allow for energy conservation and minimization of waste treatment costs.
- Tar compounds are removed using a nickel-based catalyst in an innovative fluidized bed reformer able to treat dusty syngas.
- After chlorine and particle removal, the syngas is further purified in a desulfurization system utilizing regenerable ZnO-based sorbents with 10-40 times the higher sulfur capacity than commercially available materials.

Applications

- Purification of syngas from solid waste (e.g., municipal solid waste, sewage sludge, food waste) and biomass (e.g., horticultural waste) gasification.
- The purification system can treat syngas with various compositions and content of impurities, such as tar, chlorine, and sulfur compounds.

Market opportunities

- The purified syngas can be utilized in gas engines and solid oxide fuel cells or as a feedstock for chemical synthesis.

Advantages and benefits

- Energy conservation and no liquid waste generation.
- Improve profit margin and reduce the carbon footprint of the purification process of syngas produced from gasification of MSW and biomass.

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