June 2018

H2 Blue Hydrogen Process

Low Cost Hydrogen Production

H2Blue has developed an efficient, simple, low-cost hydrogen production process using its existing M2 gasification technology, pyrolysis, and steam reforming. H2Blue is offering what it believes is a unique concept in low-cost hydrogen production. The innovative process produces separate streams of Hydrogen and Carbon Dioxide.

The H2Blue gasification thermo-chemical process will cut the cost of hydrogen generation to less than half of current production costs using Steam Methane Reforming (SMR). The process would be very competitive with current conventional energy sources such as coal, petroleum, and natural gas. These fossil fuels and biomass (wood waste) can be used to make hydrogen from the H2Blue environmentally friendly process. Ninety percent conversion efficiencies or greater are possible, depending on fuel (feedstock) carbon content.

The gasified hydrogen conversion system uses proprietary fluid bed technology in the calcination, reforming, re-carbonation, combustion, and separation processes. Heat transfer is far more efficient than a conventional convective system.

Present natural gas-fueled hydrogen steam reformers are made from expensive exotic stainless steel alloys to provide reasonable equipment life.

Extreme Temperature

They typically experience a high thermal gradient across the combustion to reformer wall. These temperature extremes in the presence of hydrogen gas cause hydrogen embrittlement and premature vessel material failure due to creep stresses.

The H2Blue gasified approach separates the high heat zone from the hydrogen zone, eliminating the potential for hydrogen-related creep stress failure.

Presently used technology also requires catalysts to shift water gas from primarily carbon monoxide and hydrogen gas to carbon dioxide and hydrogen. These catalysts are expensive and susceptible to contaminant poisoning.

The H2Blue fluid bed gasified relies on chemical reaction and thermal control in addition to the catalytic effect from calcium/lime.

The fluid bed gasified catalytic effect only alters chemical equilibrium does not come at a high cost, nor is it sensitive and susceptible to poisoning. After several cycles, the calcium/lime sorbent can then be used for conventional coal sulfur capture. Thus, existing coal-fired power plants with limestone scrubbers will have limestone available at a low cost for both CO2 separation and desulfurization. This makes calcium/lime the preferred sorbent.

Thermal Reforming Source

Natural gas costs were recently over five (5) times the cost of coal, making hydrogen from coal the much preferred thermal reforming source. Fluid bed gasification can produce near pure hydrogen while emitting close to zero air emissions. Few, if any, other practical hydrogen generation processes can make this claim.

No other hydrogen production method is as cost-efficient for energy conversion! Not natural gas steam reforming, not conventional hydrocarbon gasification, not solar-based fuel cells, not anaerobic algae or enzymes, and certainly not electrolysis.

The product of combustion from hydrogen is water vapor and nitrogen when using ambient air to burn hydrogen. Hydrogen fuel would address Global Warming concerns. It is well known that to reduce Global Warming there would have to be a switch from the present use of fossil fuels which are responsible for the production of carbon dioxide (greenhouse gas). That switch would have to be to non-polluting fuel such as hydrogen.