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Global Energy LLC

Gas to Liquids technology using CO2 to make Alcohol

Structured Data

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Liquid CO2, water and electricity through our device can make alcohol, which can be further used to make polymers, plastics, ethanol, butanol, methanol, gasoline or other products.

PDF Version of the webpage (first 10 pages)

This webpage QR code

1/31/2022

Infinity Turbine GTL Module $150,000 Experimenters Platform

Infinity is now offering an experimenters platform for those who wish to develop liquid or gas CO2 to plastics and alcohol fuels. Inputs: CO2, H20, DC electricity, and Nafion or other membrane catalysts.

Our journey into CO2 to fuels started in 2004 along with John Stevens (investor) when we started Ocean Ethanol LLC. Back then we looked at using a Fischer Tropsch catalyst to convert CO2 and H2 into fuel grade ethanol and methanol. Hydrogen was problematic (too expensive to produce) so we looked at reversing a methanol fuel cell (electrolyzer). The project was shelved in 2005. But with renewed interest in the XPrize, we are now looking at adapting our developed Supercritical CO2 Systems to work with a reverse fuel cell (RFC) using Nafion.

Producing Alcohol from Liquid CO2

Infinity has already built lots of closed-loop supercritical CO2 systems, and experimented with CO2 cavitation to make a one-moving-part liquid CO2 pump.

Infinity currently sells a cart-mounted portable on-demand supercritical CO2 phase change system for $150,000 which can be used for the experiments listed below, along with many others. It is a cart which was designed to fit through any standard door, hallway, or elevator and has heaving duty casters for mobility.

We are currently looking for funding to develop the following:

1. On-Demand CO2 to Alcohol: Using our closed-loop liquid CO2 phase change system, adding Nafion in the process to make alcohol. Inputs: Liquid CO2, water, and electricity. About 3-4 kW to make a liter of alcohol (from lab experiments).

2. CO2 to Alcohol with In-Situ Power Generation: Using our closed-loop supercritical CO2 phase change system, produce the power via miniature CO2 turbine generator of static electricity generator (SEG) to power the conversion via Nafion.

3. Spin-To-Liquid (STL): A novel one-step approach to producing alcohol from liquid CO2 using a cavitation device with Nafion. This is a one-moving-part device employing sonochemistry with inputs of water and liquid CO2. Electricity is produced in-situ. Shaft rotation is required to spin the device (this can be done via a electric motor, pressure expanding turbine, or other shaft rotation such as a wind turbine).

You can further our efforts by buying our $150,000 systems (which we build - and have four in stock) or by considering an investment to fund our development.

Teaser: Why was Nikola Tesla so fascinated with static electricity and spinning discs ? Our guess is that he had already found the worlds best battery - water. The Tesla turbine (while a fascinating pump) was actually a static electricity generator originally designed to charge water. All of his Colorado Springs experiments revolved around static electricity. Power generation and (wireless) transportation was via static electricity.

1/31/2022

Supercritical CO2 to treat Nafion for Direct Methanol Fuel Cells

Supercritical carbon dioxide treatment was used to enhance performance of NR212. The microstructure of NR212 membranes was reorganized after the Sc-CO2 treatment. The treated NR212 membranes showed higher proton conductivity than Nafion 117. The treated NR212 membranes showed lower methanol permeability than Nafion 117. Direct Methanol Fuel Cell (DMFC) performance of the treated NR212 membranes was better than Nafion 117 (2012). The Nafion-grafted-polystyrene sulfonic acid (N-g-pssa) exhibits higher ion conductivity and lower methanol permeability than that of Nafion 115. The N-g-pssa membranes are tested as electrolytes in a direct methanol fuel cell. Compared with the as-received NR212 membranes, all the Sc-CO2 treated NR212 membranes show higher proton conductivity and better capacity of barrier to methanol crossover. From Fenton test, it can be found that the Sc-CO2 treated NR212 membranes have better chemical stability than that of NR212 membranes. Therefore, NR212 membranes treated by the Sc-CO2 method may be promising candidate electrolytes for DMFC applications (2020).

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Modular fluid handling device II (Components of the Gas Leverage Turbine)

A modular fluid handling device includes at least one block having opposing block faces shaped as tessellating regular polygons, and a series of block sides therebetween. Each block includes a central bore and fluid passages extending between the block faces, and possibly ducts extending between the bore and the fluid passages. The blocks may be rapidly horizontally and/or vertically affixed with their bores and/or fluid passages in communication to form a fluid handling device having the desired configuration (e.g., with the bores and fluid passages forming a desired process flow path, fluid circuit, or the like). Star wheels and/or rotor discs can be provided within the block bores for purposes of pumping fluids flowing within the bores, and/or for purposes of deriving power from fluid flow within the bores.

FIELD OF THE INVENTION

This document concerns an invention relating generally to devices for processing and sampling of gases and liquids, and more specifically to devices allowing rapid construction of fluid reactors, distillers, extractors, homogenizers, filtration/separation devices, process models (e.g., devices for modeling engine cycles, refrigeration cycles, etc.), and other devices for handling fluids.

BACKGROUND OF THE INVENTION

Fluid handling devices including fermenters, distillers, filtration tanks, evaporators, etc. (or combinations of these components) are exceedingly common in industry and in research labs. Researchers and engineers also often need to experiment with models for common thermodynamic cycles, e.g., refrigeration cycles (vapor compression cycle, Einstein cycle, etc.) and power cycles (Otto cycle, Diesel cycle, Brayton cycle, Rankine cycle, etc.). While it is often desirable to generate prototypes or small-scale versions of such devices, they are usually time-consuming, difficult, and expensive to construct. One approach commonly used in laboratories is to connect glassware vessels (e.g., flasks, towers, heat exchangers, etc.) with rubber tubing so that the vessels form some desired fluid process model. Even apart from the significant time and expense required for their construction, these are quite fragile, are unsuitable for pressurized processes, and are also usually unsuitable for processes involving extreme temperatures or corrosive materials owing to the weakness of the tubing. In some cases, more durable fluid handling devices can be formed from metal vessels connected with (for example) brazed copper tubing, but these involve even greater time, cost, and fabrication burdens.

A prior patent (U.S. Pat. No. 7,146,999 to Giese et al., which is incorporated by reference herein) describes a modular fluid handling system wherein modular blocks bear passageways for carrying fluids, and wherein inserts having different functionality—e.g., valve inserts, filter inserts, turbine inserts, pump inserts, heating/cooling inserts, sensor inserts, flow routing/diverting inserts, etc.—can be inserted into selected blocks. The blocks, with or without inserts, can be affixed together to construct a durable fluid handling device. This document relates to improvements and additions to the modular fluid handling system described in U.S. Pat. No. 7,146,999 to Giese et al.

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Gas Leverage Turbine

SeaWater Turbine:
High bypass flow to reduce acoustic and thermal signature.
Used to aereate water to release CO_2, saltwater distillation (water maker), and more.

CO_2 Turbine (Brayton Cycle or Organic Rankine Cycle):
Used for making power, pumping, and sonochemistry to make plastics, recycle precious metals from Lithium batteries and E-waste and more.

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