

Innovation and Commercialization



Production of Methanol from CO₂ using Sunlight

Tech ID: UTA 13-35

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TECHNOLOGY NEED

Fossil fuels emit a number of air pollutants that are harmful to both the environment and public health. Methanol is a cleaner burning alternative to fossil fuels and can be used in power generation as well as vehicle fuel. Methanol is applicable in a wide variety of chemical processes, including the manufacturing of plastics, adhesives and solvents, and also in waste-water treatment. The current method to convert carbon dioxide to methanol requires the use of a co-catalyst and must be conducted at high operating pressures and temperatures, inflating the overall cost of production. So to clean the environment and reduce the cost of methanol production a new approach has to be implemented.

INVENTION DESCRIPTION/SOLUTION

We have developed a novel process that has an optimized photo-electrochemical reduction process by using a specific photoactive catalyst. The process operates at the mild condition of 25°C and 1.0 Atm absolute pressure. The energy required to form the product from the reactants is derived from a combination of electricity and solar energy thereby eliminating the need of high operating pressures and temperatures, resulting in a more efficient production of methanol. This would make power plants and electric cars ecofriendly because the CO₂ generated for electricity is captured and used.

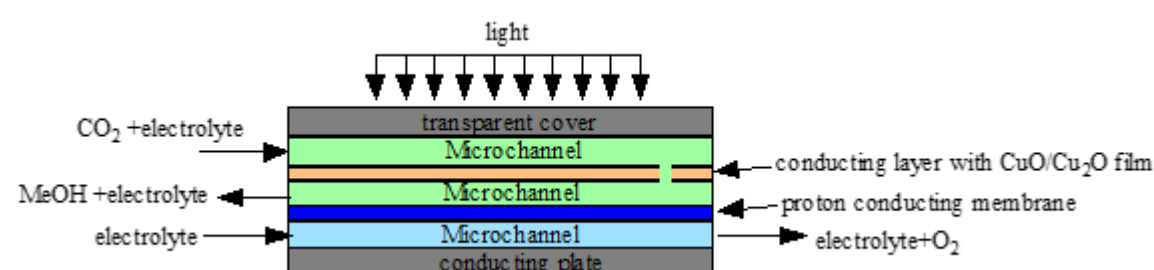


Figure: Cross-section for flow cell for the continuous reduction of CO₂ to MeOH

APPLICATIONS

- Plastic and polymer manufacturing for manufacturing methanol
- Power plants for reducing carbon emissions
- Refineries for manufacturing methanol
- Paints and adhesives to manufacture methanol

KEY BENEFITS

- Converts greenhouse gases to liquid fuel
- 95% electrochemical efficiency
- Simpler and cost effective conversion of CO₂
- Earning Carbon Credits

STAGE OF DEVELOPMENT

Prototype and tested

INTELLECTUAL PROPERTY STATUS

US Patent 10,280,525

US Divisional Patent application pending



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