

Report
On
Biocatalysts for conversion of carbon dioxide into fuels

SciTech Patent Art
Hyderabad
India

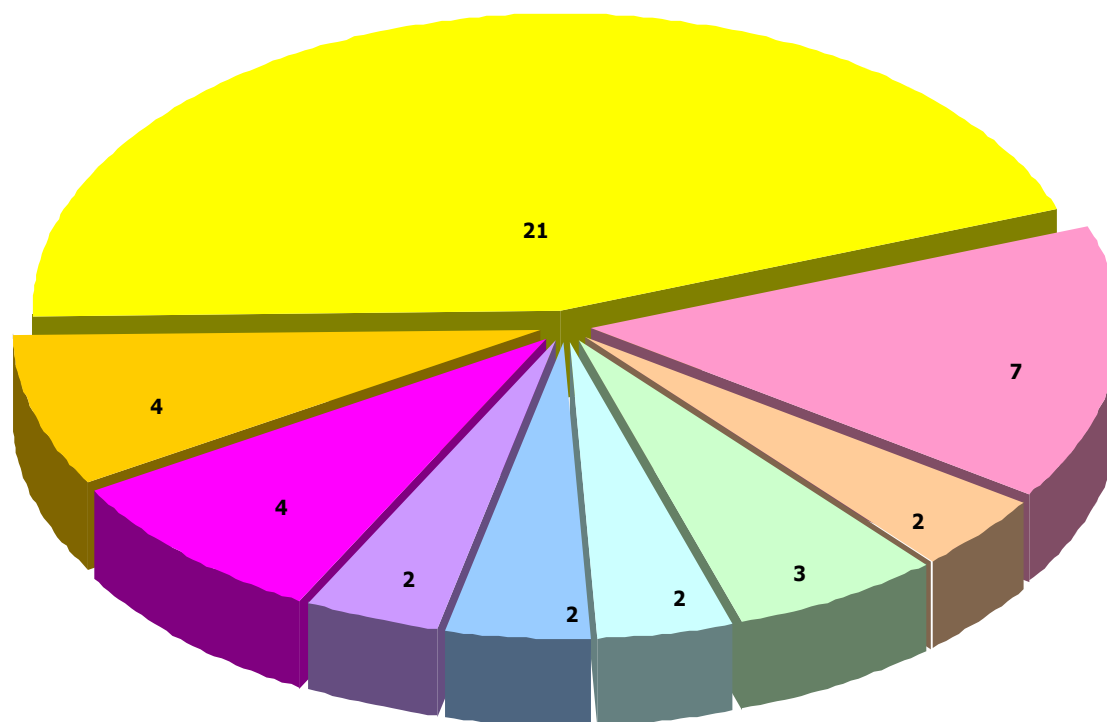


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Assignee-wise distribution of IP activity

- In the area of biocatalyst for the conversion of CO₂ to fuels, CO₂ Solution Inc. is the lead player followed by U.S. Department of Energy with three patent records.
- Many universities have also researched on the transformation of CO₂ into fuels using biocatalysts.
- Two independent inventors viz. Sanjoy Kumar Bhattacharya and Lee James Weifu have filed two patents each. While the former patents are no longer active, Lee James patents have been recently published.

Assignees with <2 records have been clubbed together as "Other Assignees"



CO2 Solution Inc.	Ineos USA LLC	Department of Energy (USA)
University of Western Ontario	Bhattacharya Sanjoy Kumar	Lee James Weifu
Academic & Research institute	Independent inventor(s)	Other Assignees

Focus of top filers

Key Player	Focus
CO₂ Solution Inc.	Formulation for the absorption of CO ₂ ; Process and a plant for recycling carbon dioxide; Process and apparatus for the biocatalytic treatment of gases Process for purifying energetic gases; Triphasic bioreactor for physico-chemically treating a gas
United States of America Department of Energy	Plants for photosynthetic production of ethanol from carbon dioxide; continuous method for producing ethanol from the anaerobic bacterial fermentation of a gases; Apparatus and method for extracting and sequestering CO ₂ from a gas stream
University of Western Ontario	Bio-fuel cell system based on the microbial regeneration of the oxidant, ferric ions; Fuel cell bioreactor for producing electrical power
Sanjoy Kumar Bhattacharya	Conversion of carbon dioxide from an internal combustion engine exhaust by fixation; Biotechnological process of solubilization and concentration of CO ₂ from emission exhausts or streams
Ineos USA LLC	Gasification for the production of alcohol from a gaseous substrate containing at least one reducing gas containing at least one microorganism.
Lee James Weifu	Designer organisms for photo-biological production of butanol and ethanol from carbon dioxide and water.

Focus of the Research / Academic Institutions

Research / Academic Institutions	Focus of the patent
The University of Western Ontario	Regeneration of the oxidant and ferric ions by microbes using fuel cell bioreactor
Louisiana State University	Bioprocess for the detoxification and degradation of volatile toxic organic compounds using cell reactor
The University of Tulsa	Conversion of organic contaminants into harmless gases using biocatalyst beads
University of Cordoba	Method for producing bio-diesel using porcine pancreatic lipase as an enzymatic biocatalyst
National Science Foundation	Use of methanogenic microorganisms for the reduction of carbon dioxide to methane gas

Citation Velocity

Assignee/Applicant	Patent/ Publication Number	Title	Year issued	Cited by	Self citation	Other citations	Avg Cites by Year
Aquanautics Corporation	US4602987A	System for the extraction and utilization of oxygen from fluids	1986	46	8	Wayne State University(3) CO2 Solution Inc(2) Bend Research Inc(2)	1.81
Bioengineering Resources Inc.	US5821111A	Bioconversion of waste biomass to useful products	1998	26	1	Nanologix Inc.(6) Gas Technology Institute.(2) Massachusetts Institute Of Technology(2)	1.64
E. I. Du Pont de Nemours and Company	US5486292A	Adsorbent biocatalyst porous beads	1996	26	1	University of Tulsa(3) Microgen Corporation(3) Battelle Energy Alliance LLC(3)	1.63
Ineos Usa Llc	US5593886A	Clostridium stain which produces acetic acid from waste gases	1997	27	Nil	Bioengineering Resources Inc.(10) Lanzatech New Zealand Limited(3) Emmaus Foundation Inc.(2)	1.56
Trachtenberg; Michael C,	US6143556A	Enzyme systems for gas processing	2000	22	3	The Regents of the University of Michigan(4) CO2 Solution Inc.(3) Morphic Technologies Aktiebolag (Publ.)(2)	1.50
CO₂ Solution	US20040029257A1	Process for purifying energetic gases such as biogas and natural gas	2004	12	1	Steris Inc.(4)	1.50
Kinetic Biosystems, Inc.	US20020061270A1	Method and apparatus for wet gas scrubbing	2002	11	2	Clemson University(2) Strata Products (Usa) Inc.(1)	1.14
Aquanautics Corporation	US4761209A	System for the extraction and utilization of oxygen from fluids	1988	28	Nil	The Board of Trustees of the Leland Stanford Junior University(2) Praxair Technology Inc.(2) Baxter International Inc.(1)	1.10
The University Of Western Ontario	WO2005001981A2	Biofuel cell	2005	7	3	Magneto Special Anodes B V.(3)	1.04
E. I. Du Pont De Nemours And Company	WO2006110891A2	Treatment Of Biomass To Obtain A Target Chemical	2006	5	Nil	Medoff Marshall,(2)	1.04

Recently filed patents

Name of the Assignee	Rec. No.	Patent/Publication No.	Year of Publication	Title of the patent / publication
Lee James Weifu	42	WO2009105733A2	2009	Designer organisms for photobiological butanol production from carbon dioxide and water
	43	WO2009105714A2	2009	Designer oxyphotobacteria and greenhouse distillation for photobiological ethanol production from carbon dioxide and water
National Science Foundation	44	US2009317882A1	2009	Electromethanogenic reactor and processes for methane production
Ineos USA LLC	45	WO2009154788A2	2009	Methods for sequestering carbon dioxide into alcohols via gasification fermentation
Gyco Inc.	46	US2009151252A1	2009	Method and apparatus for reducing co2 in a stream by conversion to a syngas for production of energy
Gevo Inc.	47	US2009226990A1	2009	Methods for the economical production of biofuel precursor that is also a biofuel from biomass

Non-Patent literature & Recent developments

Recent non-patent literature

1. [Development of a Novel Fermentation Process for the Anaerobic Conversion of Glycerol and CO₂ into Succinic Acid Using E. coli](#)
2. [Synthesis of Biodiesel in Supercritical Fluids](#)

Research Programmes

1. [Carbon dioxide neutral, integrated biofuel facility](#)
2. Thermostable Enzymes as Biocatalysts in the Biofuel Industry

Products/ News reports

1. [Carbon Sciences eyes China for its CO₂-to-fuel technology](#)
2. [Carbon Sciences Inc. Uses Synthetic Biology to Accelerate CO₂ to Fuel Technology](#)