

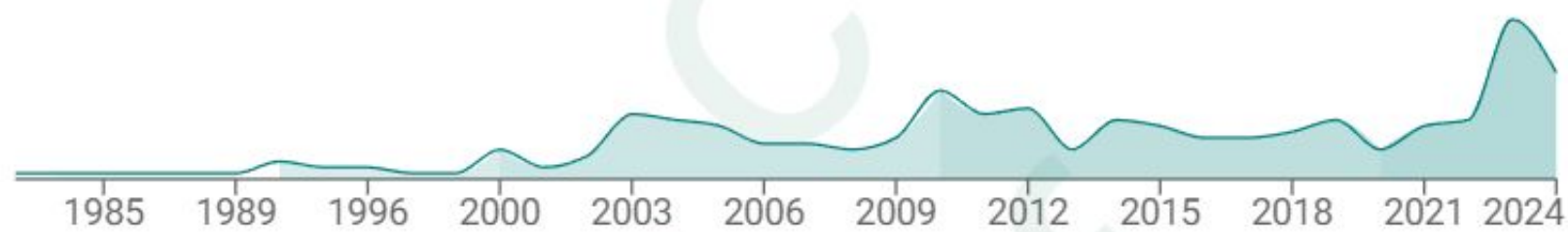
"HYDROGEN FUEL CELL"

CREATED BY



First Date: 1979-11-06

First Patent: [4173524](#)



Top 10 CPC

H01M2250-20 (27 patents) - Fuel cells in motive systems, e.g. vehicle, ship, plane	Y02E60-50 (16 patents) - Fuel cells	B64D27-24 (13 patents) - Aircraft characterised by the type or position of power plant (fuselages or wings adapted for mounting power plant [CPC: B64C]) using steam, electricity, or spring force ([CPC: B64D27/16] takes precedence)	H01M8-065 (13 patents) - Combination of fuel cells with means for production of reactants or for treatment of residues (regenerative fuel cells [CPC: H01M8/18]) with means for production of gaseous reactants by dissolution of metals or alloys; by dehydriding
H01M8-04201 (22 patents) - Reactant storage and supply, e.g. means for feeding, pipes	H01M8-04089 (15 patents) - Arrangements for control of reactant parameters, e.g. pressure or concentration of gaseous reactants	H01M8-04029 (12 patents) - Heat exchange using liquids	H01M2008-1095 (11 patents) - Fuel cells with polymeric electrolytes
	H01M16-006 (14 patents) - Structural combinations of different types of electrochemical generators of fuel cells with other electrochemical devices, e.g. capacitors, electrolyzers of fuel cells with rechargeable batteries	H01M8-04753 (12 patents) - Pressure; Flow of fuel cell reactants	

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PATENTS

#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
1	11984630	2024-05-14	2023-05-02	Method for producing electricity from a hydrogen fuel cell	Jamal Hussain Al-Smail;	King Fahd University of Petroleum and Minerals;
2	11978936	2024-05-07	2023-05-02	Hydrogen membrane fuel cell with electrode assembly	Jamal Hussain Al-Smail;	King Fahd University of Petroleum and Minerals;
3	11958352	2024-04-16	2023-10-24	Reconfiguration of combustion engine powered haul truck with hybrid hydrogen fuel cell and battery power supply	Joshua M Sweere; Spencer M Anunsen; Larissa Y Kunz; Harlan Thomas Kuo; Alexis R HUmann; David T Gerhardt; Krunal Desai; Peter Illsley; Clara Sekowski; Sarah Balles;	First Mode Holdings, Inc.;
4	11955620	2024-04-09	2023-12-19	Hybrid hydrogen power module	Julian Jeremy Soles; Christopher Jason Voorhees;	First Mode Ipp Limited;
5	11955672	2024-04-09	2022-10-19	Fuel cell hydrogen module	Yi Han; Nolan Polley; Domenico Chiera; Gregory James Hampson;	Woodward, Inc.;
6	11938805	2024-03-26	2023-03-07	Reconfiguration of diesel-powered haul truck with hybrid hydrogen fuel cell and battery power supply</		

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
21	11824234	2023-11-21	2022-09-29	Cooling multiple parallel hydrogen fuel cell stacks	Adam Knez; Spencer M Anunsen; Stuart Benson; Marie Pahlmeyer; Robert McMullen; Liam Burke;	First Mode Ipp Limited;
22	11815194	2023-11-14	2020-11-02	On/off valve for a high pressure gas tank, particularly for automotive hydrogen fuel cell system	Francesco Mondinelli;	Omb Saleri S.p.a.—societa' Benefit;
23	11795902	2023-10-24	2021-07-29	Buoyant power system method and apparatus	John Scott Perez;	Four Electrons LLC;
24	11791473	2023-10-17	2021-08-20	Method for producing a composite layer, electrochemical unit and use of the composite layer	Matthias Breitwieser; Florian Lombeck;	Hahn-schickard-gesellschaft Für Angewandte Forschung E.v.;
25	11780596	2023-10-10	2022-03-29	Aircraft evacuation system with hydrogen inflation	Kevin Le Bras;	Zeroavia, Inc.;
26	11772805	2023-10-03	2021-02-11	Configurable electrical architectures for eVTOL aircraft	Michael Raymond Hull; Steven Loveland; Yue Fan;	Textron Innovations Inc

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
41	11604911	2023-03-14	2021-06-25	Simulation of gas dynamics of different gas channel geometries in fuel cells	Christian Waechter;	Dspace Gmbh;
42	11600839	2023-03-07	2020-09-21	Power supply for underwater vehicles and sensors	Lucas Merckelbach; Prokopios Georgopanos; Torsten Brinkmann; Burkard Baschek;	Helmholtz-zentrum Hereon Gmbh;
43	D978798	2023-02-21	2021-10-19	Hydrogen fuel cell module for power generation	Yoo-Chul Shin; Jae-Hyun Lee;	Hyundai Motor Company; Kia Corporation;
44	11565607	2023-01-31	2021-06-15	High efficiency hydrogen fueled high altitude thermodynamic fuel cell system and aircraft using same	Gregor Veble Mikic; JoeBen Bevirt; Robert Gulliver Lynn; Alex Stoll;	Joby Aero, Inc.;
45	11560234	2023-01-24	2020-06-19	Lightweight high power density fault-tolerant fuel cell system, method and apparatus for clean fuel electric aircraft	Brian D Morrison;	Alakai Technologies Corporation;
46	11536339	2022-12-27	2021-02-03	Cooling system and method for auxiliary brake device of hydrogen fuel cell truck	Hyeon Chae Moon	

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
61	11063442	2021-07-13	2019-09-11	Energy generation, storage and management system	Neil Crawford;	
62	10957923	2021-03-23	2019-03-27	Preventing the formation of black ice as a result of exhaust water from motor vehicles	Guenter Hans Grosch; Thomas Werner Steinkopf; Stephan Strahl; Rainer Lach; Rolf Lorenz Loeffler;	Ford Global Technologies, LLC;
63	10940926	2021-03-09	2019-06-07	Fuel cell watercraft	Kota Sako;	Suzuki Motor Corporation;
64	10906428	2021-02-02	2018-08-22	Power supply system with hydrogen fuel cell	Kai-Tai Song; Sz-Sheng Wang; Shao-Huan Song;	National Chiao Tung University;
65	10854884	2020-12-01	2017-12-04	Method for manufacturing membrane electrode assembly for hydrogen fuel cell using two types of binders, and membrane electrode assembly manufactured by the method	Sukhwan Yun;	Hyundai Motor Company; Kia Motors Corporation;
66	10843784	2020-11-24	2015-12-03	Hydrogen recycling flight system and flight method	Byung Deok Yu; Hyunsoo Min; Junjin Jeon;	University of Seoul Industry Cooperation Foundation;

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
81	10053362	2018-08-21	2017-06-06	Gas-loading and packaging method and apparatus	Darren R Burgess; Michael Raymond Greenwald; Brent W Barbee;	IP Holdings, Inc.;
82	10017865	2018-07-10	2014-11-04	Electrochemical method for producing pure-oxygen gas and oxygen-lean gas from oxygen-containing gas mixtures	Xiaobing Zhu; Weikun Zhu; Aimin Zhu; Jinglin Liu; Xiaosong Li;	Dalian University of Technology;
83	9994961	2018-06-12	2015-07-10	Electrocatalyst for hydrogen evolution and oxidation reactions	Feng Jiao; Qi Lu; Gregory S Hutchings; Jingguang Chen;	University of Delaware; Columbia University in the City of New York;
84	9991536	2018-06-05	2016-12-01	Self-supplied hydrogen fuel cell system and working method thereof	Yongfeng Liu; Hongbing Chen; Jianjun Qin; Pucheng Pei; Shengzhuo Yao;	Beijing University of Civil Engineering and Architecture;
85	9966611	2018-05-08	2010-06-08	Solution based nanostructured carbon materials (NCM) coatings on bipolar plates in fuel cells	Ramesh Sivarajan;	
86	9966615	2018-05-08	20			

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
101	9236624	2016-01-12	2014-03-04	Use of ammonia as source of hydrogen fuel and as a getter for air-CO2 in alkaline membrane fuel cells	Miles Page; Dario Dekel; Ziv Gottesfeld; Shimshon Gottesfeld;	Elbit Systems Land and C4i Ltd.;
102	9203095	2015-12-01	2012-11-30	Method for manufacturing palladium-platinum core-shell catalysts for fuel cells	Bum Wook Roh; In Chul Hwang; Joon Taik Park; Sang Il Choi; Ran Choi;	Hyundai Motor Company; Kia Motors Corporation; Korea Advanced Institute of Science and Technology;
103	9190671	2015-11-17	2011-03-21	Bismuth palladium based catalyst for a fuel cell with a molecular hydrogen source	Alexandros Anastasopoulos; Brian Elliott Hayden;	The University of Southampton;
104	9174199	2015-11-03	2009-05-26	Methanol steam reforming catalysts	Qinglin Zhang; Robert J Farrauto; Christopher R Castellano;	Basf Corporation;
105	9156714	2015-10-13	2015-02-06	Energy generation system and related uses thereof	Michel J McCluskey; Mark Becker; Michael Pollock; Daniel R Markiewicz;	Concurrent Technologies Corporation;
106	9150101	2015-10-06				

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
121	8609294	2013-12-17	2010-10-21	Method to provide electrical insulation between conductive plates of a hydrogen fuel cell	Matthew J Beutel; Ronald L James; Daniel P Miller; Steven J Spencer;	Gm Global Technology Operations LLC;
122	8455146	2013-06-04	2007-12-20	Rapid start-up and operating system for a fuel cell power plant utilizing a reformat	Michael L Perry;	Utc Power Corporation;
123	8431281	2013-04-30	2008-07-28	Methods of operating fuel cells	Stephen A Marsh;	Encite LLC;
124	8381658	2013-02-26	2012-02-17	Hydrogen fuel cell hybrid locomotives and methods of operating the same	Arnold R Miller; Kris S Hess; Timothy L Erickson; James L Dipppo;	Bnsf Railway Company;
125	8347645	2013-01-08	2010-02-05	Hydrogen fuel cell driven HVAC and power system for engine-off operation including PEM regenerative hydrogen production	Edward N Miller;	Marz Industries, Inc.;
126	8288055	2012-10-16	2009-01-20	Fuel cell system having a hydrogen separation member	John W Halloran; Timothy LaBreche; Shaowu Zha; Aaron T Crumm;	

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
141	8006627	2011-08-30	2010-02-10	Cooling systems for hydrogen hybrid locomotives and hydrogen hybrid locomotives using the same	Arnold R Miller; Kris S Hess; Timothy L Erickson; James L Dipppo;	Bnsf Railway Company;
142	8003267	2011-08-23	2009-09-03	Flexible power supply	Jie-Ren Ku; Chan-Li Hsueh; Ya-Yi Hsu; Cheng-Yen Chen; Shing-Fen Tsai; Reiko Ohara; FangHei Tsau; Chien-Chang Hung; Ming-Shan Jeng;	Industrial Technology Research Institute;
143	7971538	2011-07-05	2010-02-10	Power management systems for hydrogen hybrid locomotives and hydrogen hybrid locomotives using the same	Arnold R Miller; Kris S Hess; Timothy L Erickson; James L Dipppo;	Bnsf Railway Company;
144	7966945	2011-06-28	2010-02-10	Isolation and support structures for hydrogen hybrid locomotives and hydrogen hybrid locomotives using the same	Arnold R Miller; Kris S Hess; Timothy L Erickson; James L Dipppo;	Bnsf Railway Company;
145	7959898	2011-06-14	2009-06-26	Hydrogen supply device	Chan-Li Hsueh; Jie-Ren Ku; Ya-Yi Hsu; Shing-Fen Tsai; Reiko Ohara; Chien-Chang Hung; Cheng-Yen Chen; Ming-Shan Jeng; Fanghei Tsau;	Industrial Technology Research Institute;
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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
161	7682724	2010-03-23	2003-10-16	Use of metal supported copper catalysts for reforming alcohols	David A Morgenstern;	Monsanto Technology LLC;
162	7677043	2010-03-16	2005-09-08	Steam powered hybrid vehicle	Mike C Corbett;	
163	7671482	2010-03-02	2007-02-02	Hydrogen powered vehicle refueling strategy	Thomas W Tighe;	Gm Global Technology Operations LLC;
164	7622207	2009-11-24	2005-09-16	Fuel cell cartridge with reformat filtering	Ian W Kaye;	Ultracell Corporation;
165	7582274	2009-09-01	2004-05-21	Carbon nanostructure catalyst support	Daniel Cossement; Richard Chahine; Tapan K Bose;	Her Majesty the Queen in Right of Canada, As Represented by the Minister of National Defence of Her Majesty's Canadian Government;
166	7569294	2009-08-04	2004-12-23	Modular portable battery charging system using hydrogen fuel cells	David Ross Graham; George Amir Meski; Jianguo Xu; Robert Francis Horninger;	Air Products and Chemicals, Inc.

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
181	7169497	2007-01-30	2003-05-15	Electrochemical cells	Stuart M Davis; Klaus Brandt;	The Gillette Company;
182	7141324	2006-11-28	2005-11-29	Hydrogen passivation shut down system for a fuel cell power plant	Paul R Margiott; Francis R Preli, Jr; Galen W Kulp; Michael L Perry; Carl A Reiser; Ryan J Balliet;	Utc Fuel Cells, LLC;
183	7118611	2006-10-10	2003-05-27	Nanoparticle mixtures for hydrogen storage, transportation, and distribution	David G Snow; Charles J Brumlik;	
184	7097925	2006-08-29	2003-01-27	High temperature fuel cell power plant	Bowie G Keefer;	Questair Technologies Inc.;
185	7029779	2006-04-18	2004-11-09	Fuel cell and power chip technology	Stephen A Marsh;	Integrated Fuel Cell Technologies, Inc.;
186	6991866	2006-01-31	2004-09-29	Fuel cell and power chip technology	Stephen A Marsh;	Integrated Fuel Cell Technologies, Inc.;
187	6984464					

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#	Patent No	Pub. Date	Filed	Title	Inventors	Assignees
221	6344985	2002-02-05	2000-12-05	Multiple port bi-directional power converter	Steve Heart Akerson;	Heart Transverter S.a.;
222	6296687	2001-10-02	1999-04-30	Hydrogen permeation through mixed protonic-electronic conducting materials	Eric D Wachsman; Naixiong Jiang;	Her Majesty the Queen in Right of Canada As Represented by the Minister of Natural Resources;
223	6296964	2001-10-02	1999-12-23	Enhanced methanol utilization in direct methanol fuel cell	Xiaoming Ren; Shimshon Gottesfeld;	University of California;
224	6159256	2000-12-12	1999-11-12	Method for desulfurizing a fuel for use in a fuel cell power plant	Leonard J Bonville, Jr; Charles L DeGeorge; Peter F Foley; Jay Garow; Roger R Lesieur; John L Preston, Jr; Donald F Szydlowski;	International Fuel Cells, LLC;
225	6159624	2000-12-12	1997-09-26	High-proton-conductive antimonic acid film	Kiyoshi Ozawa; Yoshio Sakka; Tetsuo Uchikoshi; Muneyuki Amano;	National Research Institute for Metals;
226	6156084	2000-12-05	1998-06-24	System for desulfurizing a fuel for use in a fuel cell power plant		

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241	4537839	1985-08-27	1983-11-16	Fuel cell and method of purging a fuel cell	Donald S Cameron;	Johnson Matthey Public Limited Company;
242	4217186	1980-08-12	1979-04-02	Process for chloro-alkali electrolysis cell	Wayne A McRae;	Ionics, Inc.;
243	4173524	1979-11-06	1978-09-14	Chlor-alkali electrolysis cell	Wayne A McRae;	Ionics, Inc.;

ASSIGNEES

#	Name	Patents
91	Electronics and Telecommunications Research Institute	1
92	Agco Sa	1
93	Signa Chemistry, Inc.	1
94	Marz Industries, Inc.	1
95	Adaptive Materials, Inc.	1
96	Global Tungsten & Powders Corp.	1
97	Kabushiki Kaisha Toyota Chuo Kenkyusho	1
98	Hitachi Maxell, Limited	1
99	Nanotek Instruments, Inc.	1
100	International Business Machines Corporation	1
101	Advanced Hydrogen Power Systems, Inc.	1
102	Byd Company Limited	1
103	Monsanto Technology LLC	1
104	Her Majesty the Queen in Right of Canada, As Represented by the Minister of National Defence of Her Majesty's Canadian Government	1
105	Air Products and Chemicals, Inc.	1
106	Cornell Research Foundation Inc.	1
107	Cbh2 Technologies, Inc.	1
108	Honda Motor Co., Ltd.	1
109	The Gillette Company	1
110	National University of Singapore	1
111	Nuvera Fuel Cells, Inc.	1
112	Oro Grande Technology LLC	1
113	Co2 Solution Inc.	1
114	Tohoku Techno Arch Co.,	

ATTORNEYS

#	Name	Patents
91	NK Patent Law	1
92	Smith, Gambrell & Russell, LLP	1
93	RatnerPrestia	1
94	Steven M. Greenberg, Esq.	1
95	CRGO Law	1
96	Ohlandt, Greeley, Ruggiero & Perle, L.L.P.	1
97	McDermott Will & Emery LLP	1
98	Brinks Gilson & Lione	1
99	Rothwell, Figg, Ernst & Manbeck, P.C.	1
100	ISUS Intellectual Property PLLC	1
101	Renner, Otto, Boisselle & Sklar, LLP	1
102	Pearl Cohen Zedek Latzer Baratz LLP	1
103	Baker and Hostetler LLP	1
104	James F. Hann	1
105	Haynes Beffel & Wolfeld LLP	1
106	Dinsmore&Shohl, LLP	1
107	Lucas & Mercanti, LLP	1
108	Barry Evans, Esq.	1

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1	Seattle, WA (US)	16
2	Los Alamos, NM (US)	13
3	Gyeonggi-do, KR	12
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5	Vancouver, CA	10
6	Shizuoka, JP	9
7	Shanghai, CN	7
8	Santa Cruz, CA (US)	7
9	Daejeon, KR	7
10	Rochester, NY (US)	7
11	Albuquerque, NM (US)	7
12	London, GB	6
13	Fairport, NY (US)	6
14	Fargo, ND (US)	6
15	West Fargo, ND (US)	6
16	Lakewood, CO (US)	6
17	Westminster, CO (US)	6
18	Parker, CO (US)	6
19	Arvada, CO (US)	6
20	Stonington, CT (US)	6
21	Singapore, SG	

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91	Boswell, PA (US)	2
92	Ripon, CA (US)	2
93	Montpellier, FR	2
94	Davis, CA (US)	2
95	Winters, CA (US)	2
96	Pittsford, NY (US)	2
97	East Hartford, CT (US)	2
98	Penfield, NY (US)	2
99	Hilldale, UT (US)	2
100	Bloomington, MN (US)	2
101	South Windsor, CT (US)	2
102	Los Gatos, CA (US)	2
103	Mountain View, CA (US)	2
104	Kaohsiung, TW	2
105	Yongkang, TW	2
106	Tainan, TW	2
107	Sijhih, TW	2
108	Trois-Rivieres, CA	2
109	Allentown, PA (US)	2
110	Ithaca, NY (US)	

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181	Wuerselen, DE	1
182	Rommerskirchen, DE	1
183	New Taipei, TW	1
184	Gwangju-si, KR	1
185	Plainview, NY (US)	1
186	West Hempstead, NY (US)	1
187	Sound Beach, NY (US)	1
188	Hicksville, NY (US)	1
189	Gyeonggi-Do, KR	1
190	Busan, KR	1
191	McLean, VA (US)	1
192	Diamondhead, MS (US)	1
193	Gunpo-si, KR	1
194	Shizuoka-ken, JP	1
195	Islip Terrace, NY (US)	1
196	Herndon, VA (US)	1
197	Golden Valley, MN (US)	1
198	Andover, MN (US)	1
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271	La Mirada, CA (US)	1
272	Hutchinson Island, FL (US)	1
273	Dublin, OH (US)	1
274	Creve Coeur, MO (US)	1
275	Dover, FL (US)	1
276	Bloomfield, NY (US)	1
277	Montreal, CA	1
278	Harleysville, PA (US)	1
279	Wrightstown, PA (US)	1
280	Pleasanton, CA (US)	1
281	Golden, CO (US)	1
282	Longmont, CO (US)	1
283	East Windsor, CT (US)	1
284	Groveton, NH (US)	1
285	Torrance, CA (US)	1
286	Norfolk, MA (US)	1
287	Kamenz, DE	1
288	Dover, MA (US)	1
289	Watertown, MA (US)	1
290	Cambridge, MA (US)</	

PATENT APPLICATION PUBLICATIONS

#	Pub. No	Filed	Title	Inventors	Assignees
121	20110143240	2010-07-30	Hydrogen Generation System, Method for Generating Hydrogen Using Solid Hydrogen Fuel and Method for Providing Hydrogen for Fuel Cell Using the Same	Chan-Li Hsueh; Jie-Ren Ku; Cheng-Yen Chen; Ming-Shan Jeng; Fang-hei Tsau;	INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE;
122	20120094202	2010-04-21	DEVICE FOR PRODUCING ELECTRICITY FOR A SUBMARINE COMPRISING A FUEL CELL	Sylvain Rethore;	DCNS;
123	20100167175	2010-03-16	ELECTROCHEMICAL CATALYSTS	Robert Dopp; Kimberly McGrath; R Carpenter;	QUANTUMSPHERE, INC.;
124	20100183929	2010-02-08	SOLID OXIDE FUEL CELL SYSTEM INCLUDING A WATER BASED FUEL REFORMER	Aaron Crumm; Timothy LaBreche;	ADAPTIVE MATERIALS, INC.;
125	20100069228	2009-10-29	ELECTROCHEMICAL CATALYSTS	Robert Dopp; Kimberly McGrath; R Carpenter;	QUANTUMSPHERE, INC.;
126	20100183931	2009-08-10	On board hydrogen producing fuel cell technology(elements) coil and plate system used separately or in combination to dis		

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