XVI. Project Listings by Organization

3M Co	ompar	ny
V.	C.1	Advanced Cathode Catalysts and Supports for PEM Fuel Cells
V.	G.5	Membranes and MEAs for Dry, Hot Operating Conditions
V.		Novel Approaches to Immobilized Heteropoly Acid (HPA) Systems for High Temperature, Low Relative Humidity Polymer-Type Membranes
A Moı	untain	Top, LLC
X.	8	HyDRA: Hydrogen Demand and Resource Analysis Tool
Addis	on Ba	in
VI	II.6	Hydrogen Safety Panel
ADM	A Pro	ducts
V.]	K.2	Low-Cost Manufacturable Microchannel Systems for Passive PEM Water Management
Advan	ced T	echnology Corporation
III	[.4	Materials Solutions for Hydrogen Delivery in Pipelines
Air Li	quide	
III	[.1	Hydrogen Delivery Infrastructure Options Analysis
Air Pr	oduct	s and Chemicals, Inc.
III	[.9	Reversible Liquid Carriers for an Integrated Production, Storage and Delivery of Hydrogen 404
III	1.15	Hydrogen Regional Infrastructure Program in Pennsylvania
IV	.B.2	Hydrogen Storage by Reversible Hydrogenation of Liquid-Phase Hydrogen Carriers
IV	.C.1m	Enabling Discovery of Materials With a Practical Heat of Hydrogen Adsorption
VI	I.5	California Hydrogen Infrastructure Project
VI	I.10	Validation of an Integrated Hydrogen Energy Station
VI	II.6	Hydrogen Safety Panel
X		Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System
A1		· ·
		ontra Costa Transit
VI	1.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Albem	arle (Corporation
IV	.A.1m	Catalyzed Nano-Framework Stablized High-Density Reversible Hydrogen Storage Systems510
Altair	nano	
VI	I.8	Hydrogen Filling Station
Ameri	can N	ational Standards Institute
VI	II.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
Ames	Laboı	ratory
II.	G.5	High Flux Metallic Membranes for Hydrogen Recovery and Membrane Reactors

Archer D	aniels Midland Company	
II.A.6	Hydrogen Generation from Biomass-Derived Carbohydrates via the Aqueous-Phase Reforming (APR) Process	44
Argonne 1	National Laboratory	
II.A.4	Pressurized Steam Reforming of Bio-Derived Liquids for Distributed Hydrogen Production	35
II.A.13	Integrated Short Contact Time Hydrogen Generator (SCPO)	78
II.A.14	Distributed Reforming of Renewable Liquids via Water Splitting Using Oxygen Transport Membrane (OTM).	85
II.H.4	High Temperature Thermochemical Processes.	
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	
III.2	Hydrogen Delivery Infrastructure Analysis	
III.10	Hydrogen Pipeline Compressors	
IV.C.1		
IV.E.2	System Level Analysis of Hydrogen Storage Options	
V.A.1	Fuel Cell Systems Analysis.	
V.A.8	Fuel Cell Testing at Argonne National Laboratory	
V.C.1	Advanced Cathode Catalysts and Supports for PEM Fuel Cells	
V.C.4	PEMFC using Aligned Carbon Nanotubes as Electrodes in MEAs	
V.C.6	Non-Platinum Bimetallic Cathode Electrocatalysts.	
V.C.7	Advanced Cathode Catalysts	
X.2	Fuel-Cycle Analysis of Hydrogen-Powered Fuel-Cell Systems with the GREET Model	
X.11	Hydrogen Quality Issues for Fuel Cell Vehicles	
Arizona S	tate University	
II.A.8	Zeolite Membrane Reactor for Water-Gas-Shift Reaction for Hydrogen Production	51
II.B.3	Development of Water Splitting Catalysts Using a Novel Molecular Evolution Approach	96
II.D.2	One Step Biomass Gas Reforming-Shift Separation Membrane Reactor	130
V.B.1	Nitrided Metallic Bipolar Plates	844
V.G.10	Protic Salt Polymer Membranes: High-Temperature Water-Free Proton-Conducting Membranes	987
Arkema I	nc.	
V.G.7	Improved, Low-Cost, Durable Fuel Cell Membranes	974
ASME In	ternational	
III.15	Hydrogen Regional Infrastructure Program in Pennsylvania	427
VIII.1	Hydrogen Safety Codes and Standards	1183
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards	1205
ASME Sta	andards Technology LLC	
III.4	Materials Solutions for Hydrogen Delivery in Pipelines	381
ATI Alleg	heny Ludlum	
V.B.1	Nitrided Metallic Bipolar Plates	844
ATI Wah		
II.D.2	One Step Biomass Gas Reforming-Shift Separation Membrane Reactor	130

Automotiv	e Fuel Cell Corporation
V.C.2	Development of Alternative and Durable High Performance Cathode Supports for PEM Fuel Cells
VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Avalence I	LLC
II.B.6	High-Capacity, High Pressure Electrolysis System with Renewable Power Sources
Ballard Po	wer Systems
V.B.2	Next Generation Bipolar Plates for Automotive PEM Fuel Cells
V.D.5	Intergovernmental Stationary Fuel Cell System Demonstration
V.H.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization
BASF Cata	alysts LLC
V.F.1	Platinum Group Metal Recycling Technology Development
BASF Fue	Cell ETEK
V.D.4	FC40 International Stationary Fuel Cell Demonstration
Battelle M	emorial Institute
V.A.10	Market Opportunity Assessment of Direct Hydrogen PEM Fuel Cells in Federal and Portable Markets
VII.13	Technology Validation: Fuel Cell Bus Evaluations
IX.3	Hydrogen Education for Code Officials
BCS Fuel	Cells
V.H.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization
Becht Engi	ineering
VIII.6	Hydrogen Safety Panel
BekkTech	LLC
V.G.2	Lead Research and Development Activity for DOE's High Temperature, Low Relative Humidity Membrane Program
Benemann	Associates
VII.11	Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems 1156
Bloom End	ergy, Inc.
V.D.6	Low-Cost Co-Production of Hydrogen and Electricity
BMW Hyb	orid Technology Corporation
III.9	Reversible Liquid Carriers for an Integrated Production, Storage and Delivery of Hydrogen 404
Boston Un	iversity
IV.B.3	Chemical Hydride Slurry for Hydrogen Production and Storage
Bowling G	reen State University
C	Production of Hydrogen For Clean and Renewable Sources of Energy for Fuel Cell Vehicles

BP Americ	a
VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
VII.2	Ford and BP Hydrogen Fuel Cell Vehicle and Infrastructure Demonstration Program Review 2008
X.5	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System
Brookhave	n National Laboratory
	Catalyzed Water Oxidation by Solar Irradiation of Band-Gap-Narrowed Semiconductors
	Aluminum Hydride Regeneration
V.C.3	Highly Dispersed Alloy Cathode Catalyst for Durability874
V.C.7	Advanced Cathode Catalysts
Cabot Fuel	Cells
V.C.7	Advanced Cathode Catalysts
California 1	Institute of Technology
II.K.7	Sunlight-Driven Hydrogen Formation by Membrane-Supported Photoelectrochemical Water Splitting
IV.A.1h	Development and Evaluation of Advanced Hydride Systems for Reversible Hydrogen Storage483
IV.A.1r	Synthesis of Nanophase Materials for Thermodynamically Tuned Reversible Hydrogen Storage 534
IV.C.1n	Enhanced Hydrogen Dipole Physisorption
V.C.6	Non-Platinum Bimetallic Cathode Electrocatalysts
Case Weste	ern Reserve University
V.B.2	Next Generation Bipolar Plates for Automotive PEM Fuel Cells
V.C.5	Novel Non-Precious Metals for PEMFC: Catalyts Selection through Molecular Modeling and Durability Studies
V.G.3	Microstructural Design and Development of High Performance Polymer Electrolyte Membranes
V.G.5	Membranes and MEAs for Dry, Hot Operating Conditions
V.G.12	Poly(p-Phenylene Sulfonic Acids): PEMs with Frozen-In Free Volume
V.G.13	NanoCapillary Network Proton Conducting Membranes for High Temperature Hydrogen/Air Fuel Cells
V.H.3	Water Transport Exploratory Studies
V.J.1	Light-Weight, Low Cost PEM Fuel Cell Stacks
Catacel Co	rporation
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Center for	Technology Commercialization
II.B.1	Low-Cost, High-Pressure Hydrogen Generator90
Ceralink	
V.F.1	Platinum Group Metal Recycling Technology Development
Ceramatec,	Inc.
II H 3	Laboratory-Scale High Temperature Electrolysis System 234

CFD Rese	arch Corporation
V.H.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization
Chemical	Composite Coatings Int'l, LLC
III.4	Materials Solutions for Hydrogen Delivery in Pipelines
Chemsulta	ants International Inc.
V.G.3	Microstructural Design and Development of High Performance Polymer Electrolyte Membranes 953
Chevron T	echnology Ventures LLC
III.1 VII.3	Hydrogen Delivery Infrastructure Options Analysis
Chrysler L	LC
VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
City of Las	s Vegas
VII.9	Southern Nevada Alternative Fuels Demonstration Project
City of Sa	nta Fe Springs
VIII.6	Hydrogen Safety Panel
ClearFuels VII.11	Technology, Inc. Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems1156
Clemson U	Jniversity
V.E.2	Fundamental Effects of Impurities on Fuel Cell Performance and Durability
V.G.11	Fluoroalkylphosphonic-Acid-Based Proton Conductors
Colorado	School of Mines
II.A.9	High Performance Palladium-Based Membrane for Hydrogen Separation and Purification57
II.A.12	Distributed Bio-Oil Reforming
II.G.2	Cost-Effective Method for Producing Self-Supporting Pd Alloy Membrane for Use in the Efficient Production of Coal-Derived Hydrogen
V.G.5	Membranes and MEAs for Dry, Hot Operating Conditions
V.G.8	Novel Approaches to Immobilized Heteropoly Acid (HPA) Systems for High Temperature, Low Relative Humidity Polymer-Type Membranes
Colorado	State University
II.K.9	A Combinatorial Approach to Realization of Efficient Water Photoelectrolysis
Columbia	Gas of Kentucky
III.4	Materials Solutions for Hydrogen Delivery in Pipelines
Compresso	ed Gas Association, Inc.
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
Concurrer	nt Technologies Corporation
III.15	Hydrogen Regional Infrastructure Program in Pennsylvania

Construction	on Engineering Research Laboratory
V.D.5	Intergovernmental Stationary Fuel Cell System Demonstration
CSA Amer	ica
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
Cummins 1	Power Generation
V.I.1	Diesel-Fueled SOFC System for Class 7/Class 8 On-Highway Truck Auxiliary Power
Daimler A	${\sf G}$
VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Dalhousie	University
V.C.1	Advanced Cathode Catalysts and Supports for PEM Fuel Cells
David Bow	v man
X.1	Development of HyTrans Model and Integrated Scenario Analysis
Delaware S	State University
IV.A.3	Center for Hydrogen Storage Research at Delaware State University
V.F.2	Platinum Recycling Technology Development
Delphi Cor	rporation
V.I.3	Solid Oxide Fuel Cell Development for Auxiliary Power in Heavy Duty Vehicle Applications 1056
DGS Meta	llurgical Solutions, Inc.
III.4	Materials Solutions for Hydrogen Delivery in Pipelines
Directed To	echnologies, Inc.
II.A.3	Analysis of Ethanol Reforming System Configurations
V.A.2	Mass Production Cost Estimation for Direct H ₂ PEM Fuel Cell System for Automotive
	Applications
X.6	Updates to the H2A Hydrogen Production Discounted Cash Flow Model (H2A Version 2.0) 1269
Distributed	d Energy Systems
VII.8	Hydrogen Filling Station
Drexel Uni	iversity
IV.C.4	Carbide-Derived Carbons with Tunable Porosity Optimized for Hydrogen Storage 696
DTE Energ	\mathbf{y}
VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Duke Univ	rersity
IV.C.1d	Optimizing the Binding Energy of Hydrogen on Nanostructured Carbon Materials through Structure Control and Chemical Doping
DuPont	
V.F.2	Platinum Recycling Technology Development939

Ecommerce	e Systems, Inc.
IX.3	Hydrogen Education for Code Officials
Edison Ma	terials Technology Center
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Edison We	lding Institute/Delphi
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Electricore	, Inc.
V.I.3	Solid Oxide Fuel Cell Development for Auxiliary Power in Heavy Duty Vehicle Applications 1056
Electrolytic	ea, Inc.
IV.B.1h	Low-Cost Precursors to Novel Hydrogen Storage Materials
Eltron Res	earch & Development, Inc.
II.G.1	Scale-Up of Hydrogen Transport Membranes for IGCC and FutureGen Plants
Endura Pla	astics, Inc.
V.J.1	Light-Weight, Low Cost PEM Fuel Cell Stacks
EnerFuel, I	nc.
VII.7	Florida Hydrogen Initiative
Energetics,	Inc.
VIII.6	Hydrogen Safety Panel
X.9	Lessons Learned for Fueling Infrastructure
Engineerin	g Procurement & Construction
II.B.4	Renewable Electrolysis Integrated System Development and Testing
Entergy Nu	ıclear
II.B.7	Advanced Alkaline Electrolysis
Ergenics C	orporation
II.A.7	Integrated Hydrogen Production, Purification and Compression System
ESI US R&	aD
V.H.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization
Faraday Te	chnology, Inc.
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Firexplo	
VIII.6	Hydrogen Safety Panel
Florida Hy	drogen Initiative, Inc.
VII.7	Florida Hydrogen Initiative
Florida Int	ernational University
II.F.4	Photobiological Hydrogen Research

Ford Moto	r Company
IV.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods
VII.2	Ford and BP Hydrogen Fuel Cell Vehicle and Infrastructure Demonstration Program Review 2008
X.5	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System
Freudenbe	rg-NOK General Partnership
V.B.3	Low-Cost Durable Seals for PEMFCs
FuelCell E	nergy. Inc.
III.12	Development of Highly Efficient Solid-State Electrochemical Hydrogen Compressor
V.E.3	Effects of Impurities on Fuel Cell Performance and Durability
V.G.15	High Temperature Membrane with Humidification-Independent Cluster Structure
VII.10	Validation of an Integrated Hydrogen Energy Station
G&S Titan	ium. Inc.
II.G.5	High Flux Metallic Membranes for Hydrogen Recovery and Membrane Reactors
Gas Equip	ment Engineering Corporation
III.7	Innovative Hydrogen Liquefaction Cycle
Gas Techn	ology Institute
II.D.2	One Step Biomass Gas Reforming-Shift Separation Membrane Reactor
IV.C.2	Electron-Charged Graphite-Based Hydrogen Storage Material
VII.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
III.1	Hydrogen Delivery Infrastructure Options Analysis
GE Energy	Nuclear
II.B.7	Advanced Alkaline Electrolysis
GE Global	Research Center
	Integrated Short Contact Time Hydrogen Generator (SCPO)
	Advanced Alkaline Electrolysis
VII.11	Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems1156
GenCell C	orporation
V.B.1	Nitrided Metallic Bipolar Plates
General A	tomics Corporation
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water245
General M	otors
V.H.2	Visualization of Fuel Cell Water Transport and Performance Characterization Under Freezing Conditions
VII.4	Hydrogen Vehicle and Infrastructure Demonstration and Validation
Georgia In	astitute of Technology
_	First-Principles Modeling of Hydrogen Storage in Metal Hydride Systems

Giner I	Electrochemical Systems, LLC
II.B	.1 Low-Cost, High-Pressure Hydrogen Generator90
II.B	.5 PEM Electrolyzer Incorporating an Advanced Low-Cost Membrane
II.H	.2 Hybrid Sulfur Thermochemical Process Development
V.G	.16 Dimensionally Stable Membranes
V.G	.18 Dimensionally Stable High Performance Membrane
Golden	BioEnergy Corporation
II.F	5 Biological Systems for Hydrogen Photoproduction
GrafTe	ch International Ltd.
V.B	2 Next Generation Bipolar Plates for Automotive PEM Fuel Cells
GWS S	olutions of Tolland, LLC
VII	
H2 Tecl	nnology Consulting LLC
IV.I	Best Practices for Characterizing Hydrogen Storage Properties of Materials
H2Gen	Innovations, Inc.
II.A	.1 Low-Cost Hydrogen Distributed Production System Development
Hatch I	Mott MacDonald
III.4	Materials Solutions for Hydrogen Delivery in Pipelines
Hatch 1	Technology LLC
IV.I	Chemical Hydride Slurry for Hydrogen Production and Storage
Hawaii	Hydrogen Carriers
IV.A	A.2 Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods
Henkel	Corporation
V.B	3 Low-Cost Durable Seals for PEMFCs
HERA	Hydrogen Storage Systems
IV.I	Chemical Hydride Slurry for Hydrogen Production and Storage
Honeyv	vell Engineering & Technology
V.B	4 Cost and Performance Enhancements for a PEM Fuel Cell Turbocompressor
V.K	1 Development of Thermal and Water Management System for PEM Fuel Cells
HRL L	aboratories, LLC
IV.A	1.1b Thermodynamically Tuned Nanophase Materials for Reversible Hydrogen Storage
Humbo	ldt State University
IX.6	Hydrogen Technology and Energy Curriculum (HyTEC)
Huntsn	nan Advanced Materials
V.B	2 Next Generation Bipolar Plates for Automotive PEM Fuel Cells

Hydrogen	Education Foundation
IX.5	H2 and You: A Public Education Initiative
Hydrogen	Safety, LLC
VIII.6	Hydrogen Safety Panel
Hydrogen	Solar
VII.8	Hydrogen Filling Station
HyPerCon	np Engineering, Inc.
II.B.6	High-Capacity, High Pressure Electrolysis System with Renewable Power Sources
III.15	Hydrogen Regional Infrastructure Program in Pennsylvania
Hyundai N	Notor Company
VII.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Hyundai-F	KIA America Technical Center Inc.
VII.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Idaho Nati	ional Laboratory
II.H.3	Laboratory-Scale High Temperature Electrolysis System
IdaTech, L	LC
II.G.2	Cost-Effective Method for Producing Self-Supporting Pd Alloy Membrane for Use in the Efficient Production of Coal-Derived Hydrogen
V.I.5	Research & Development for Off-Road Fuel Cell Applications
Innochem,	Inc.
IV.B.1h	Low-Cost Precursors to Novel Hydrogen Storage Materials
Inorganic	Specialists, Inc.
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Intelligent	Energy
V.D.3	Development and Demonstration of a New-Generation High Efficiency 1-10 kW Stationary Fuel Cell System
Intematix	Corporation
II.E.1	Photoelectrochemical Hydrogen Production: UNLV-SHGR at UH Project Subtask140
IV.A.1n	High-Throughput Combinatorial Chemistry Development of Complex Hydrides
IV.B.4	Development of Regenerable High-Capacity Boron Nitrogen Hydrides For Hydrogen Storage 612
Internation	nal Code Council, Inc.
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
Internatio	nal Truck and Engine Corporation
V.I.1	Diesel-Fueled SOFC System for Class 7/Class 8 On-Highway Truck Auxiliary Power
Ion Power	, Inc.
V.F.2	Platinum Recycling Technology Development
Iowa State	University
II.G.5	High Flux Metallic Membranes for Hydrogen Recovery and Membrane Reactors

J. Craig Ver	nter Institute
II.F.1	Hydrogen From Water in a Novel Recombinant O ₂ -Tolerant Cyanobacterial System
Jet Propuls	ion Laboratory
IV.A.1h	Development and Evaluation of Advanced Hydride Systems for Reversible Hydrogen Storage 483
IV.A.1r	Synthesis of Nanophase Materials for Thermodynamically Tuned Reversible Hydrogen Storage 534
V.C.1	Advanced Cathode Catalysts and Supports for PEM Fuel Cells
VIII.1	Hydrogen Safety Codes and Standards
John Deere	
V.E.2	Fundamental Effects of Impurities on Fuel Cell Performance and Durability
Johnson M	atthey Fuel Cells, Inc.
V.C.3	Highly Dispersed Alloy Cathode Catalyst for Durability874
V.G.7	Improved, Low-Cost, Durable Fuel Cell Membranes
Karl Gross	
IV.C.1j	NREL Research as Part of the Hydrogen Sorption Center of Excellence
Kelvin Hec	ht
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
Kettering U	Jniversity
V.G.1	Development of a Novel Proton Conducting Membrane and a CFD Multi-Phase Porous Flow
	Model for PEM Fuel Cells
Keyspan	
V.D.5	Intergovernmental Stationary Fuel Cell System Demonstration
Kia Motors	Corporation
VII.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Lawrence I	Berkeley National Laboratory
V.G.6	New Polyelectrolyte Materials for High Temperature Fuel Cells
Lawrence I	Livermore National Laboratory
III.8	Inexpensive Delivery of Cold Hydrogen in High Performance Glass Fiber Composite Pressure
IV.C 1h	Vessels
VII.6	Automotive Cryogenic Capable Pressure Vessels for Compact, High Dormancy (L)H ₂ Storage1131
X.7	Water Needs and Constraints for Hydrogen Pathways
Linde Nort	h America, Inc.
II.A.7	Integrated Hydrogen Production, Purification and Compression System
Longitude	122 West, Inc.
VIII.8	IEA Hydrogen Task 18: Evaluation of Integrated Demonstration Systems
	s National Laboratory Catalytic Solubilization and Conversion of Lignogallulosic Foodstocks to Hydrogen
II.D.4	Catalytic Solubilization and Conversion of Lignocellulosic Feedstocks to Hydrogen
II.G.5	High Flux Metallic Membranes for Hydrogen Recovery and Membrane Reactors
1 v.D.1a	2000 Overview - DOE Chemical rightogen storage Center of Excenence (Criscoe)

Los Alamo	os National Laboratory (Continued)	
IV.B.1f	Chemical Hydrogen Storage R&D at Los Alamos National Laboratory	577
V.A.5	Applied Science for Electrode Cost, Performance, and Durability	816
V.A.7	Component Benchmarking Subtask Reported: USFCC Durability Protocol Development and Technically-Assisted Industrial and University Partners	826
IX.7	H ₂ Educate – Middle School Hydrogen Education Project	855
V.C.6	Non-Platinum Bimetallic Cathode Electrocatalysts	. 886
V.C.7	Advanced Cathode Catalysts	892
V.E.1	Effects of Fuel and Air Impurities on PEM Fuel Cell Performance	922
V.G.4	PEM Fuel Cell Durability	957
V.H.3	Water Transport Exploratory Studies	1042
VIII.4	Hydrogen Fuel Quality: The Year In Review	.1193
X.13	Evaluation of the Potential Environmental Impacts from Large-Scale Use and Production of Hydrogen in Energy and Transportation Applications	1293
Makel Eng	gineering	
II.J.1	Developing Improved Materials to Support the Hydrogen Economy	268
Massachu	setts Institute of Technology	
III.7	Innovative Hydrogen Liquefaction Cycle	395
Materials	and Systems Research, Inc.	
II.C.3	Development of a Novel Efficient Solid-Oxide Hybrid for Co-Generation of Hydrogen and Electricity Using Nearby Resources for Local Application	121
Media and	l Process Technology Inc.	
II.C.2	Water-Gas Shift Reaction via a Single Stage Low-Temperature Membrane Reactor	117
Membran	e Reactor Technologies Ltd.	
II.A.7	Integrated Hydrogen Production, Purification and Compression System	48
Mercedes-	Benz USA LLC	
VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	.1111
Metal Hyd	dride Technologies, Inc.	
II.G.3	Experimental Demonstration of Advanced Palladium Membrane Separators for Central High-Purity Hydrogen Production	215
Metallurgi	ical Viability, Inc.	
IV.B.3	Chemical Hydride Slurry for Hydrogen Production and Storage	607
Methanol	Foundation	
V.I.2	Direct Methanol Fuel Cell Prototype Demonstration for Consumer Electronics Applications	.1052
Michigan	Molecular Institute	
V.G.3	Microstructural Design and Development of High Performance Polymer Electrolyte Membranes	953
Michigan	Technological University	
IV.D.4	Novel Metal Perhydrides for Hydrogen Storage	717
V.H.2	Visualization of Fuel Cell Water Transport and Performance Characterization Under Freezing	1037

Midwest	Optoelectronics
II.E.3	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen
Missouri	University of Science and Technology
II.C.3	Development of a Novel Efficient Solid-Oxide Hybrid for Co-Generation of Hydrogen and Electricity Using Nearby Resources for Local Application
X.10	Hydrogen and Fuel Cell Analysis: Lessons Learned from Stationary Power Generation
Montana	State University
II.F.3	Use of Biological Materials and Biologically Inspired Materials for H ₂ Catalysts
V.A.9	Montana Palladium Research Initiative: Detection of Trace Platinum Group Element Particulates with Laser Spectroscopy
Mo-Sci (Corporation
	5 Glass Microspheres for Hydrogen Storage
MTI Mic	ro Fuel Cells
V.I.2	Direct Methanol Fuel Cell Prototype Demonstration for Consumer Electronics Applications 1052
MVSyste	ms, Incorporated
II.E.1	Photoelectrochemical Hydrogen Production: UNLV-SHGR at UH Project Subtask140
II.E.9	Photoelectrochemical Hydrogen Production: MVSystems Incorporated
VII.1	Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems1156
_	k Corporation
II.K.2	3 Strained TiO ₂ Photoanodes
National	Center for Manufacturing Sciences
VI.2	Advanced Manufacturing Technologies for Renewable Energy Applications - a DOE/NCMS Partnership
National	Energy Technology Laboratory
II.D.2	
II.G.5	
National	Fire Protection Agency
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
National	Fuel Cell Research Center
VII.5	California Hydrogen Infrastructure Project
National	Hydrogen Association
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
National	Institute of Standards and Technology
	National Institute of Standards and Technology (NIST)
IV.C.	lc NIST Center for Neutron Research in Support of the Hydrogen Sorption Center of Excellence 627
V.A.6	Neutron Imaging Study of the Water Transport in Operating Fuel Cells
V.H.3	
VI.3	Metrology for Fuel Cell Manufacturing

Na	tional R	enewable Energy Laboratory	
	II.A.12	Distributed Bio-Oil Reforming	73
	II.B.4	Renewable Electrolysis Integrated System Development and Testing	101
	II.B.7	Advanced Alkaline Electrolysis	110
	II.D.1	Indirectly Heated Gasification of Biomass to Produce Hydrogen	126
	II.E.1	Photoelectrochemical Hydrogen Production: UNLV-SHGR at UH Project Subtask	140
	II.E.2	Photoelectrochemical Water Splitting	146
	II.E.3	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen	151
	II.E.4	University of Nevada, Reno Photo-Electrochemical Project.	155
	II.E.6	Theory of Oxides for Photo-Electrochemical Hydrogen Production	162
	II.F.4	Photobiological Hydrogen Research	196
	II.F.5	Biological Systems for Hydrogen Photoproduction	200
	II.F.6	Fermentative and Electrohydrogenic Approaches to Hydrogen Production	204
	II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	245
	II.K.3	Efficient H ₂ Production via Novel Molecular Chromophores and Nanostructures	280
	II.K.4	Regulation of H ₂ and CO ₂ Metabolism: Factors Involved in Partitioning of Photosynthetic Reductant in Green Algae	285
	IV.C.1a	Overview of the DOE Hydrogen Sorption Center of Excellence	
	IV.C.1j	NREL Research as Part of the Hydrogen Sorption Center of Excellence	
	IV.F.2	Purdue Hydrogen Systems Laboratory	
	VI.1	Fuel Cell Membrane Electrode Assembly Manufacturing R&D	
	VII.12	Controlled Hydrogen Fleet and Infrastructure Analysis	
	VII.13	Technology Validation: Fuel Cell Bus Evaluations.	
	VIII.1	Hydrogen Safety Codes and Standards	
	IX.3	Hydrogen Education for Code Officials	
	X.3	Discrete Choice Analysis of Consumer Preferences for Refueling Availability	
	X.4	Macro-System Model	
	X.6	Updates to the H2A Hydrogen Production Discounted Cash Flow Model (H2A Version 2.0)	
	X.8	HyDRA: Hydrogen Demand and Resource Analysis Tool	
	X.9	Lessons Learned for Fueling Infrastructure	
	X.15	Adapting the H2A Hydrogen Production Cost Analysis Model to Stationary Applications	1302
	X.16	DOE Hydrogen Program Risk Analysis in Support of EERE's Portfolio Analysis	
Ne		o Institute of Mining and Technology	
		Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems	1156
Ne		State College of Ceramics at Alfred University Glass Microspheres for Hydrogen Storage	721
	14.D.5	Glass wherespiretes for frydrogen storage	, / 21
Ne	xant, Ind		
	III.1	Hydrogen Delivery Infrastructure Options Analysis	365
Ne	xTech M	aterials Inc.	
	II.J.1	Developing Improved Materials to Support the Hydrogen Economy	268
Ne	xtEnergy		
	VII.1	Hydrogen to the Highways - Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	1111
		Validation Project	1111

Northea	stern University	
V.C.	Novel Non-Precious Metals for PEMFC: Catalyts Selection through Molecular Modeling and Durability Studies	881
Nuvera	Fuel Cells, Inc.	
V.D.	Cost-Effective High-Efficiency Advanced Reforming Module (CHARM)	903
V.K.	3 CIRRUS: Cell Ice Regulation and Removal Upon Start-Up	1079
Oak Rid	ge Institute for Science and Education	
	.1k ORNL Progress within the DOE Center of Excellence for Hydrogen Sorption: Synthesis and Processing of Single-Walled Carbon Nanohorns for Hydrogen Storage and Catalyst Supports	633
Oak Rid	lge National Laboratory	
II.A.	9 High Performance Palladium-Based Membrane for Hydrogen Separation and Purification	57
II.A.	10 Novel Low-Temperature Proton Transport Membranes	63
III.5	Composite Technology for Hydrogen Pipelines	386
III.1	3 Hydrogen Permeability and Integrity of Steel Welds	418
IV.A	1g Preparation and Reactions of Complex Hydrides for Hydrogen Storage: Metal Borohydrides and Aluminum Hydrides	479
IV.C	ORNL Progress within the DOE Center of Excellence for Hydrogen Sorption: Synthesis and Processing of Single-Walled Carbon Nanohorns for Hydrogen Storage and Catalyst Supports	666
V.A.	4 Microstructural Characterization Of PEM Fuel Cell MEAs	811
V.B.	Nitrided Metallic Bipolar Plates	844
V.C.	Development of Alternative and Durable High Performance Cathode Supports for PEM Fuel Cells	868
V.C.	Non-Platinum Bimetallic Cathode Electrocatalysts	886
V.C.	7 Advanced Cathode Catalysts	892
V.G.	7 Improved, Low-Cost, Durable Fuel Cell Membranes	974
V.H.	3 Water Transport Exploratory Studies	. 1042
V.J.2	Fuel Cell Research at the University of South Carolina	. 1068
IX.1	Hydrogen Knowledge and Opinions Assessment	1219
X.1	Development of HyTrans Model and Integrated Scenario Analysis	1247
Ohio St	ate University	
II.A.	5 Investigation of Reaction Networks and Active Sites in Bio-Ethanol Steam Reforming over Co-Based Catalysts	39
II.A.	8 Zeolite Membrane Reactor for Water-Gas-Shift Reaction for Hydrogen Production	51
II.J.1	Developing Improved Materials to Support the Hydrogen Economy	268
II.K.	12 Photoactive Inorganic Membranes for Charge Transport	310
IV.A	.1s Lightweight Intermetallics for Hydrogen Storage	539
OLI Sys	tems, Inc.	
•	.1d Electrochemical Hydrogen Storage Systems	570
Opinion	Research Corporation	
IX.1	Hydrogen Knowledge and Opinions Assessment	1219
Oregon	Steel Mills	
_	Materials Solutions for Hydrogen Delivery in Pipelines	381

Orlando So	cience Center
VII.7	Florida Hydrogen Initiative
Ovonic Hy	drogen Systems LLC
IV.E.7	Standardized Testing Program for Solid-State Hydrogen Storage Technologies
PA Govern	ment Services
X.3	Discrete Choice Analysis of Consumer Preferences for Refueling Availability
PACCAR,	Inc.
V.I.3	Solid Oxide Fuel Cell Development for Auxiliary Power in Heavy Duty Vehicle Applications 1056
Pacific Inte	ernational Center for High Technology Research
VII.11	Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems
Pacific No	rthwest National Laboratory
II.A.2	Distributed Hydrogen Production from Biomass Reforming
II.K.10	Fundamental Investigations of Water Splitting on Model TiO ₂ Photocatalysts Doped for Visible Light Absorption
III.9	Reversible Liquid Carriers for an Integrated Production, Storage and Delivery of Hydrogen 404
IV.A.4	Effects and Mechanisms of Mechanical Activation on Hydrogen Sorption/Desorption of Nanoscale Lithium Nitrides and Lithium Borohydrides
IV.B.1c	Chemical Hydrogen Storage Research at PNNL
V.C.2	Development of Alternative and Durable High Performance Cathode Supports for PEM Fuel Cells
V.K.2	Low-Cost Manufacturable Microchannel Systems for Passive PEM Water Management
VIII.3	Hydrogen Safety Tools: Software and Hardware
VIII.6	Hydrogen Safety Panel
IX.2	Hydrogen Safety: First Responder Education
X.13	Evaluation of the Potential Environmental Impacts from Large-Scale Use and Production of Hydrogen in Energy and Transportation Applications
Pall Corpo	ration
II.A.9	High Performance Palladium-Based Membrane for Hydrogen Separation and Purification57
Parker Hai	nnifin Ltd
II.B.5	PEM Electrolyzer Incorporating an Advanced Low-Cost Membrane
Pennsylvar	nia State University
II.F.6	Fermentative and Electrohydrogenic Approaches to Hydrogen Production
II.K.14	A Hybrid Biological-Organic Half-Cell for Generating Dihydrogen
II.K.21	Tandem Hybrid Solar Energy System
II.K.22	Photoelectrochemistry of Semiconductor Nanowire Arrays
II.K.24	Highly Ordered Nanotube Arrays and their Use in Water Photoelectrolysis
IV.B.1d	Electrochemical Hydrogen Storage Systems
IV.C.1e	Advanced Boron and Metal-Loaded High Porosity Carbons
V.G.14	New Proton Conductive Composite Materials with Co-Continuous Phases Using Functionalized and Crosslinkable VDE/CTEE Fluoropolymers

Plug Power	r Inc.
V.D.4	FC40 International Stationary Fuel Cell Demonstration
V.D.5	Intergovernmental Stationary Fuel Cell System Demonstration
PolyFuel, I	nc.
V.I.4	Direct Methanol Fuel Cell Power Supply for All-Day True Wireless Mobile Computing 1059
Polyphotor	nics
II.B.4	Renewable Electrolysis Integrated System Development and Testing
PoroGen, I	LLC
IV.C.3	Nanostructured Activated Carbon for Hydrogen Storage
Potomac-H	Iudson Engineering
X.14	Potential Environmental Impacts of Hydrogen-Based Transportation and Power Systems 1298
Powderme	t, Inc.
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
VIII.6	Hydrogen Safety Panel
Power+End	ergy, Inc.
II.G.3	Experimental Demonstration of Advanced Palladium Membrane Separators for Central High-Purity Hydrogen Production
Precision I	Engineering Technology
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Princeton 1	University
II.K.16	Theoretical Research Program on Bio-inspired Inorganic Hydrogen Generating Catalysts and Electrodes
Proton Ene	ergy Systems
II.B.2	Hydrogen Generation from Electrolysis: 100 kg H ₂ /day Trade Study
Protonex, 1	LLC
V.I.1	Diesel-Fueled SOFC System for Class 7/Class 8 On-Highway Truck Auxiliary Power
Purdue Un	iversity
II.K.8	Electrochemical Construction of High Performance, Low Cost Polycrystalline Photoelectrodes for Solar Hydrogen Production
IV.F.2	Purdue Hydrogen Systems Laboratory
Queen's U	niversity
X.13	Evaluation of the Potential Environmental Impacts from Large-Scale Use and Production of Hydrogen in Energy and Transportation Applications
R&D Dyna	nmics
III.7	Innovative Hydrogen Liquefaction Cycle
RCF Econo	omic and Financial Consulting, Inc.
X.5	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive
	System

REB Resea	arch and Consulting	
II.G.5	High Flux Metallic Membranes for Hydrogen Recovery and Membrane Reactors	224
Regulatory	Logic LLC	
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards	1205
Renergh		
X.9	Lessons Learned for Fueling Infrastructure	1279
Research F	Foundation of the State University of New York	
	Dimensionally Stable Membranes.	1016
Resource I	Dynamics Corporation	
III.15	Hydrogen Regional Infrastructure Program in Pennsylvania	427
Rice Unive	ersity	
	Nanoengineering the Forces of Attraction in a Metal-Carbon Array for H ₂ Uptake at Room Temperature	640
IV.C.1i	Optimization of Nano-Carbon Materials for Hydrogen Sorption	651
Rochester 1	Institute of Technology	
V.H.2	Visualization of Fuel Cell Water Transport and Performance Characterization under Freezing Conditions	
Rohm and	Haas Company	
IV.B.1h	Low-Cost Precursors to Novel Hydrogen Storage Materials	587
RTI Intern	ational	
IV.B.4	Development of Regenerable High Capacity Boron Nitrogen Hydrides as Hydrogen Storage Materials	612
V.H.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization.	
Russian Ac	cademy of Sciences	
II.F.5	Biological Systems for Hydrogen Photoproduction	200
SAE Intern	national	
VIII.1	Hydrogen Safety Codes and Standards	1183
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards	1205
Safe Hydro	ogen, LLC	
IV.B.3	Chemical Hydride Slurry for Hydrogen Production and Storage	607
Sandia Nat	tional Laboratories	
II.A.11	Ultra-Thin Proton Conduction Membranes for H ₂ Stream Purification with Protective	
	Getter Coatings.	
II.H.1	Sulfur-Iodine Thermochemical Cycle	
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	
III.11	Enabling Hydrogen Embrittlement Modeling of Structural Steels	
III.14	Geological Storage of Hydrogen	
	DOE Metal Hydride Center of Excellence	
1 V.A.1I	Development of Metal Hydrides at Sandia National Laboratories	4/1

Sar	idia Nat	ional Laboratories (Continued)
	IV.A.1m	Catalyzed Nano-Framework Stablized High-Density Reversible Hydrogen Storage Systems510
	IV.E.6	Chemical and Environmental Reactivity Properties of Hydrogen Storage Materials within the Context of Systems
	V.H.3	Water Transport Exploratory Studies
	VIII.2	Hydrogen Safety, Codes and Standards R&D: Materials Compatibility
	VIII.5	Hydrogen Safety, Codes and Standards R&D – Release Behavior
	X.17	Analysis of Energy Infrastructures and Potential Impacts from an Emergent Hydrogen Fueling Infrastructure
Sav	annah I	River National Laboratory
	II.C.1	Membrane SeparationBulk Amorphous Hydrogen Purification/Separation Membranes113
	II.H.2	Hybrid Sulfur Thermochemical Process Development
	III.6	FY 2008 SRNL Hydrogen Delivery ProjectHydrogen Permeability and Pipeline Integrity/Fiber Reinforced Composite Pipeline
	III.15	Hydrogen Regional Infrastructure Program in Pennsylvania
	IV.A.1p	Electrochemical Reversible Formation of Alane
	IV.A.1q	Li-Mg-N System Hydrogen Storage Materials and Metal Hydride System Engineering Analysis528
	IV.E.4	Fundamental Environmental Reactivity Analysis of Hydrogen Storage Materials
	V.E.2	Fundamental Effects of Impurities on Fuel Cell Performance and Durability
Sch	ott Nor	th America
	II.D.2	One Step Biomass Gas Reforming-Shift Separation Membrane Reactor
	III.4	Materials Solutions for Hydrogen Delivery in Pipelines
Sci	ence Ap	plications International, Corporation
	II.I.2	Solar High-Temperature Water-Splitting Cycle with Quantum Boost
Scr	ibner As	ssociates, Inc.
	V.G.2	Lead Research and Development Activity for DOE's High Temperature, Low Relative Humidity Membrane Program
Sec	at, Inc.	
	III.4	Materials Solutions for Hydrogen Delivery in Pipelines
SE	NTECH	Inc.
	IX.7	H ₂ Educate – Middle School Hydrogen Education Project
	VII.11	Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems
SG	L Carbo	n
	V.H.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization
	V.K.3	CIRRUS: Cell Ice Regulation and Removal Upon Start-Up
SG	L Techn	ologies GmbH
	V.H.3	Water Transport Exploratory Studies
She	ell Hydr	ogen, LLC
	VII.4	Hydrogen Vehicle and Infrastructure Demonstration and Validation

Shengbai 2	Zhang
IV.C.1j	NREL Research as Part of the Hydrogen Sorption Center of Excellence
Smart Che	emistry
VIII.1	Hydrogen Safety Codes and Standards
Southern (California Edison
VII.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Southwest	Research Institute®
II.G.2	Cost-Effective Method for Producing Self-Supporting Pd Alloy Membrane for Use in the Efficient Production of Coal-Derived Hydrogen
IV.E.7	Standardized Testing Program for Solid-State Hydrogen Storage Technologies
Spectrum	Automation
II.B.4	Renewable Electrolysis Integrated System Development and Testing
Stanford U	Jniversity
IV.A.10	Thermodynamically Tuned Nanophase Materials for Reversible Hydrogen Storage: Structure and Kinetics of Nanoparticle and Model System Materials
X.14	Potential Environmental Impacts of Hydrogen-Based Transportation and Power Systems 1298
State Univ	ersity of New York
IV.C.3	Nanostructured Activated Carbon for Hydrogen Storage
Striatus In	corporated
IV.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods
Süd Chem	ie, Inc.
II.A.1	Low-Cost Hydrogen Distributed Production System Development
Superior C	Graphite Company
IV.C.2	Electron-Charged Graphite-Based Hydrogen Storage Material
Sustainabl	e Innovations, LLC
III.12	Development of Highly Efficient Solid-State Electrochemical Hydrogen Compressor
Technolog	y Management, Inc.
II.J.1	Developing Improved Materials to Support the Hydrogen Economy
Tetra Tech	. Inc.
X.14	Potential Environmental Impacts of Hydrogen-Based Transportation and Power Systems
Texas A&N	1 University
	A Biomimetic Approach to Metal-Organic Frameworks with High H ₂ Uptake
The Media	Network
IX.4	Increasing "H2IQ": A Public Information Program
The Nation	nal Energy Education Development (NEED) Project
IX.7	H ₂ Educate – Middle School Hydrogen Education Project

The Toro (Company
V.I.5	Research & Development for Off-Road Fuel Cell Applications
TIAX LLC	
II.I.4	Solar Thermochemical Hydrogen (STCH) Production – H2A Analysis
III.1	Hydrogen Delivery Infrastructure Options Analysis
IV.E.1	Analyses of Hydrogen Storage Materials and On-Board Systems
V.A.3	Cost Analyses of Fuel Cell Stack/Systems
X.12	Assessment of Platinum Leasing Strategies for Fuel-Cell Vehicles and Platinum Availability Update
Tom Genn	
	NREL Research as Part of the Hydrogen Sorption Center of Excellence
Udelhoven	Oilfield System Services
V.D.6	Low-Cost Co-Production of Hydrogen and Electricity
United Sta	tes Fuel Cell Council
VIII.7	Supporting the Consensus-Based Process for Hydrogen Codes and Standards
United Tec	hnologies - Hamilton Sundstrand
V.E.3	Effects of Impurities on Fuel Cell Performance and Durability
United Tec	hnologies Research Center
II.D.3	A Novel Slurry-Based Biomass Reforming Process
II.G.3	Experimental Demonstration of Advanced Palladium Membrane Separators for Central High-Purity Hydrogen Production
III.9	Reversible Liquid Carriers for an Integrated Production, Storage and Delivery of Hydrogen 404
IV.A.1n	1 Catalyzed Nano-Framework Stablized High-Density Reversible Hydrogen Storage Systems510
IV.E.5	Quantifying and Addressing the DOE Material Reactivity Requirements with Analysis and Testing of Hydrogen Storage Materials and Systems
University	of Akron
V.G.10	Protic Salt Polymer Membranes: High-Temperature Water-Free Proton-Conducting Membranes 987
University	of Alabama
IV.B.1i	Main Group Element and Organic Chemistry for Hydrogen Storage and Activation
University	of Alaska
II.C.3	Development of a Novel Efficient Solid-Oxide Hybrid for Co-Generation of Hydrogen and Electricity Using Nearby Resources for Local Application
V.D.6	Low-Cost Co-Production of Hydrogen and Electricity
University	of Arizona
II.K.19	"Electronically Wired" Semiconductor Nanoparticles: Toward Vectoral Electron Transport in Hybrid Materials
University	of Arkansas at Little Rock
II.E.4	University of Nevada, Reno Photo-Electrochemical Project
II.E.8	Photoelectrochemical (PEC) Hydrogen Generation
IV.F.3	An Integrated Approach for Hydrogen Production and Storage in Complex Hydrides of Transitional Elements and Carbon-based Nanostructural Materials.

Univer	rsity (of California, Berkeley
II.	F.2	Maximizing Light Utilization Efficiency and Hydrogen Production in Microalgal Cultures
IV.	D.1	A Synergistic Approach to the Development of New Hydrogen Storage Materials, Part I
IX.	.6	Hydrogen Technology and Energy Curriculum (HyTEC)
Univer	rsity (of California, Davis
IV.	B.1b	Chemical Hydrogen Storage using Ultra-High Surface Area Main Group Materials and The Development of Efficient Amine-Borane Regeneration Cycles
V.I	.5	Research & Development for Off-Road Fuel Cell Applications
Univer	rsity (of California, Irvine
VI	I.5	California Hydrogen Infrastructure Project
Univer	rsity (of California, Los Angeles
IV.	.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods
IV.	.D.3	Hydrogen Storage in Metal-Organic Frameworks
Univer	rsity (of California, Riverside
V.C	C.7	Advanced Cathode Catalysts
Univer	rsity (of California, Santa Barbara
II.	E.7	Photoelectrochemical Hydrogen Production Using New Combinatorial Chemistry Derived Materials
IV.	.D.2	Hydrogen Storage Materials with Binding Intermediate between Physisorption and Chemisorption
Univer	rsity (of California, Santa Cruz
	•	Hydrogen Generation Using Integrated Photovoltaic and Photoelectrochemical Cells
Univer	rsity (of Central Florida
II.	I.2	Solar High-Temperature Water-Splitting Cycle with Quantum Boost
V.C	G.2	Lead Research and Development Activity for DOE's High Temperature, Low Relative Humidity Membrane Program
VI	I.7	Florida Hydrogen Initiative
Univer	rsity (of Chicago
IV.	.C.1l	Hydrogen Storage Media through Nanostructured Polymeric Materials
Univer	rsity (of Cincinnati
	A.8	Zeolite Membrane Reactor for Water-Gas-Shift Reaction for Hydrogen Production
Univer	rsity (of Colorado at Boulder
II.	I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water245
II.	I.3	Solar-Thermal Hydrogen Production Using a Metal-Oxide Based Thermochemical Water Splitting Cycle
II.	K.6	Catalyst Discovery Using Biomolecule Evolution
Univer	rsity (of Connecticut
	A.4	Effects and Mechanisms of Mechanical Activation on Hydrogen Sorption/Desorption of
377	7.7	Nanoscale Lithium Nitrides and Lithium Borohydrides
V.I	2.3	Effects of Impurities on Fuel Cell Performance and Durability

University	of Delaware
V.C.2	Development of Alternative and Durable High Performance Cathode Supports for PEM Fuel Cells
V.K.3	CIRRUS: Cell Ice Regulation and Removal Upon Start-Up
University	of Detroit Mercy
V.G.5	Membranes and MEAs for Dry, Hot Operating Conditions
University	of Georgia
II.K.5	Fundamental Studies of Recombinant Hydrogenases
University	of Hawaii
II.K.18	Production and Engineering of Hydrogenase as a Biocatalyst for Hydrogen Fuel
IV.A.1j	Fundamental Studies of Advanced High-Capacity, Reversible Metal Hydrides
V.G.7	Improved, Low-Cost, Durable Fuel Cell Membranes
VIII.1	Hydrogen Safety Codes and Standards
University	of Hawaii at Manoa
II.E.1	Photoelectrochemical Hydrogen Production: UNLV-SHGR at UH Project Subtask140
II.E.9	Photoelectrochemical Hydrogen Production: MVSystems Incorporated
VII.11	Hawaii Hydrogen Center for Development and Deployment of Distributed Energy Systems 1156
University	of Illinois at Chicago
V.C.6	Non-Platinum Bimetallic Cathode Electrocatalysts
University	of Illinois at Urbana-Champaign
X.13	Evaluation of the Potential Environmental Impacts from Large-Scale Use and Production of Hydrogen in Energy and Transportation Applications
III.3	Hydrogen Embrittlement of Pipelines: Fundamentals, Experiments, Modeling
	Reversible Hydrogen Storage Materials – Structure, Chemistry, and Electronic Structure
V.C.7	Advanced Cathode Catalysts
University	of Michigan
IV.C.1h	Hydrogen Storage by Spillover
X.5	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive
	System
University	of Minnesota
II.A.12	Distributed Bio-Oil Reforming
II.A.13	Integrated Short Contact Time Hydrogen Generator (SCPO)
University	of Missouri
IV.A.1f	Development of Metal Hydrides at Sandia National Laboratories
IV.B.1e	Chemical Hydrogen Storage Using Polyhedral Borane Anions and Aluminum-Ammonia-Borane Complexes
University	of Nevada, Las Vegas
II.E.1	Photoelectrochemical Hydrogen Production: UNLV-SHGR at UH Project Subtask
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water245
IV.F.4	Hydrogen Fuel Cells and Storage Technology Project
VC6	Non Platinum Rimetallic Cathoda Flactrocatalysts

University	of Nevada, Las Vegas (Continued)
VII.8	Hydrogen Filling Station
University	of Nevada, Reno
II.E.4	University of Nevada, Reno Photo-Electrochemical Project
IV.A.1i	Effect of Gaseous Impurities on Durability of Complex Li-based Hydrides for Hydrogen Storage 487
University	of New Brunswick
IV.A.1j	Fundamental Studies of Advanced High-Capacity, Reversible Metal Hydrides
University	of New Mexico
V.C.7	Advanced Cathode Catalysts
University	of North Carolina at Chapel Hill
II.K.1	Metal-to-Ligand Charge Transfer Excited States on Surfaces and in Rigid Media Application to Energy Conversion
IV.C.1o	Characterization of Hydrogen Adsorption by NMR
University	of North Dakota
II.D.3	A Novel Slurry-Based Biomass Reforming Process
University	of Oklahoma
II.K.17	Identification of Enzymes involved in Syntrophic H_2 production
University	of Pennsylvania
II.K.13	Modular Designed Protein Constructions for Solar Generated H ₂ From Water314
IV.B.1g	Amineborane-Based Chemical Hydrogen Storage583
IV.C.4	Carbide-Derived Carbons with Tunable Porosity Optimized for Hydrogen Storage 696
University	of Pittsburgh
IV.A.1e	First-Principles Modeling of Hydrogen Storage in Metal Hydride Systems
University	of South Carolina
V.C.5	Novel Non-Precious Metals for PEMFC: Catalyts Selection through Molecular Modeling
V.J.2	and Durability Studies
•	
ū	of South Carolina Research Foundation
VIII.1	Hydrogen Safety Codes and Standards
•	of South Florida
IV.F.1	Hydrogen Storage Research
University	of Southern Mississippi
V.G.17	Poly(cyclohexadiene)-Base Polymer Electrolyte Membranes for Fuel Cell Applications
V.G.19	Improved Membrane Materials for PEM Fuel Cell Applications
University	of Tennessee
V.G.5	Membranes and MEAs for Dry, Hot Operating Conditions
V.G.17	Poly(cyclohexadiene)-Base Polymer Electrolyte Membranes for Fuel Cell Applications
X.1	Development of HyTrans Model and Integrated Scenario Analysis

Univer	sity o	f Toledo
II.E	E.3	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen
II.E	E.5	Production of Hydrogen For Clean and Renewable Sources of Energy for Fuel Cell Vehicles 159
Univer	•	
II.C		Development of a Novel Efficient Solid-Oxide Hybrid for Co-Generation of Hydrogen and Electricity Using Nearby Resources for Local Application
IV.	A.1c	Chemical Vapor Synthesis and Discovery of H ₂ Storage Materials: Li-Al-Mg-N-H System
V.G	5.11	Fluoroalkylphosphonic-Acid-Based Proton Conductors992
Univer	sity o	f Victoria
V.H	I.1	Water Transport in PEM Fuel Cells: Advanced Modeling, Material Selection, Testing, and Design Optimization
Univer	sity o	f Washington
II.K		Real-Time Atomistic Simulation of Light Harvesting and Charge Transport for Solar Hydrogen Production
IV.I	B.1j	Solutions for Chemical Hydrogen Storage: Dehydrogenation of B-N Bonds
II.K	K.15	Hydrogenases of Methanococcus maripaludis
Univer	sitv o	f Wisconsin
II.A	۸.6	Hydrogen Generation from Biomass-Derived Carbohydrates via the Aqueous-Phase Reforming (APR) Process
UNLV	Cent	er for Energy Research
VII		Hydrogen Filling Station
UNIV	Resea	arch Foundation
II.I.		Development of Solar-Powered Thermochemical Production of Hydrogen from Water245
IV.I		Hydrogen Fuel Cells and Storage Technology Project
UOP L	I C	
IV.		Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular
1 V.2		Modeling and Combinatorial Methods
UTC P	ower	
IV.I		Hydrogen Fuel Cells and Storage Technology Project776
V.B		Low-Cost Durable Seals for PEMFCs855
V.C		Highly Dispersed Alloy Cathode Catalyst for Durability874
V.D		PEM Fuel Cell Powerplant Development and Verification
VII		Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project
Virent	Fner	gy Systems, Inc.
II.A	۱.6	Hydrogen Generation from Biomass-Derived Carbohydrates via the Aqueous-Phase Reforming (APR) Process
Virgini	a Pol	ytechnic Institute and State University
II.E		PEM Electrolyzer Incorporating an Advanced Low-Cost Membrane
II.K	X.25	Photoinitiated Electron Collection in Mixed-Metal Supramolecular Complexes: Development of Photocatalysts for Hydrogen Production
V.B		Low-Cost Durable Seals for PEMFCs855

Virginia Polytechnic Institute and State University (Continued)		
V.G.7	Improved, Low-Cost, Durable Fuel Cell Membranes974	
V.G.9	High Temperature, Low Relative Humidity, Polymer-type Membranes Based on Disulfonated Poly(arylene ether) Block and Random Copolymers Optionally Incorporating Protonic Conducting Layered Water Insoluble Zirconium Fillers	
-	Hazardous Materials Management and Emergency Response (HAMMER) Training tion Center	
IX.2	Hydrogen Safety: First Responder Education	
Volvo Truc	eks North America	
V.I.3	Solid Oxide Fuel Cell Development for Auxiliary Power in Heavy Duty Vehicle Applications 1056	
W.L. Gore	& Associates	
V.H.3	Water Transport Exploratory Studies	
V.K.3	CIRRUS: Cell Ice Regulation and Removal Upon Start-Up	
Western R	esearch Institute	
II.G.4	The Integration of a Structural Water-Gas Shift Catalyst with a Vanadium Alloy Hydrogen Transport Device	
World Res	ources Institute	
X.5	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System	
Xunlight (Corporation	
II.E.3	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen	