
XIV. Project Listings by State

Alabama

IV.B.4k	Main Group Element and Organic Chemistry for Hydrogen Storage and Activation	429
V.C.5	Development of High-Performance, Low-Pt Cathodes Containing New Catalysts and Layer Structure	787
V.F.4	Smart Energy Management of Multiple Fuel Cell Powered Applications	862

Arizona

II.B.11	Development of a Hydrogasification Process for Co-Production of Substitute Natural Gas (SNG) and Electric Power from Western Coals	83
II.C.8	Zeolite Membrane Based Shift Reactor	102
II.F.8	Development of Water Splitting Catalysts Using a Novel Molecular Evolution Approach	156
III.C.2	Hydrogen Delivery Infrastructure Options Analysis	254
IV.B.4j	Safety Analysis and Applied Research on the use of Borane-Amines for Hydrogen Storage.	427
V.B.14	Protic Salt Polymer Membranes: High-Temperature Water-Free Proton-Conducting Membranes	747
VI.C.2	Hydrogen Power Park - Business Opportunities Concept Project	989

Arkansas

II.F.1	Photoelectrochemical Hydrogen Production at University of Arkansas	134
IV.G.7	An Integrated Approach for Hydrogen Production and Storage in Complex Hydrides of Transitional Elements.	585
V.G.16	Development of a 5 kW Prototype Coal-based Fuel Cell	925

California

II.A.1	Autothermal Cyclic Reforming Based Hydrogen Generating and Dispensing System	21
II.A.2	A Reversible Planar Solid Oxide Fuel-Assisted Electrolysis Cell and Solid Oxide Fuel Cell for Hydrogen and Electricity Production Operating on Natural Gas/Biogas	24
II.B.5	Hydrogen Production for Fuel Cells via Reformation of Coal-Derived Methanol	72
II.C.9	High Performance Palladium-Based Membrane	106
II.E.1	Maximizing Light Utilization Efficiency and Hydrogen Production in Microalgal Cultures	117
II.F.3	Photoelectrochemical Hydrogen Production Using New Combinatorial Chemistry Derived Materials	142
II.F.4	Discovery of Photocatalysts for Hydrogen Production	144
II.F.5	Solar Water Splitting: Photocatalyst Materials Discovery and Systems Development.	147
II.F.7	Photoelectrochemical Hydrogen Production	154
II.F.9	Photoelectrochemical Hydrogen Production: SHGR Program Subtask	161
II.G.2	Sulfur-Iodine Thermochemical Cycle	178
II.G.4	Nuclear Reactor/Hydrogen Process Interface	186
II.H.6	Modular System for Hydrogen Generation and Oxygen Recovery	207
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	210
III.C.2	Hydrogen Delivery Infrastructure Options Analysis	254
III.D.1	Inexpensive Delivery of Compressed Hydrogen with Advanced Vessel Technology	261
IV.A.1	High Density Hydrogen Storage System Demonstration Using NaAlH ₄ Based Complex Compound Hydrides	281
IV.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods.	285

California (Continued)

IV.A.4	DOE Metal Hydride Center of Excellence	293
IV.A.4b	Synthesis of Nanophase Materials for Thermodynamically Tuned Reversible Hydrogen Storage.	301
IV.A.4d	Thermodynamically Tuned Nanophase Materials	310
IV.A.4e	High Throughput Combinatorial Chemistry Development of Complex Metal Hydrides	316
IV.A.4f	Development and Evaluation of Advanced Hydride Systems for Reversible Hydrogen Storage.	319
IV.A.4j	Development of Metal Hydrides at Sandia National Laboratories	333
IV.A.4l	Thermodynamically Tuned Nanophase Materials for Reversible Hydrogen Storage: Structure and Kinetics of Nanoparticle and Model System Materials	343
IV.B.4f	Chemical Hydrogen Storage Using Polyhedral Borane Anion Salts	416
IV.B.4i	Rapid Throughput Catalyst Synthesis and Testing for Chemical Hydrogen Storage.	424
IV.B.4l	Chemical Hydrogen Storage using Ultra-High Surface Area Main Group Materials.	433
IV.B.5	Development of Regenerable High Capacity Boron Nitrogen Hydrides as Hydrogen Storage Materials	437
IV.C.1b	Enhanced Hydrogen Dipole Physisorption	452
IV.C.1d	Metal-doped Carbon Aerogels for Hydrogen Storage	457
IV.D.1	A Synergistic Approach to the Development of Nanostructured Materials for Hydrogen Storage (Part I)	504
IV.D.2	Hydrogen Storage Materials with Binding Intermediate between Physisorption and Chemisorption.	510
IV.D.3	Hydrogen Storage in MOFs	515
IV.E.1	Low Cost, High Efficiency, High Pressure Hydrogen Storage	521
IV.E.2	Advanced Concepts for Containment of Hydrogen and Hydrogen Storage Materials.	525
IV.G.3	Solid State Hydrogen Storage Reduced Infrastructure Requirement Chemistry/Hardware Optimization Study.	572
IV.I.4	Metal-Organic Frameworks for Highly Selective Separations	601
IV.I.13	A Synergistic Approach to the Development of New Classes of Hydrogen Storage Materials	637
V.B.16	New Polyelectrolyte Materials for High Temperature Fuel Cells, Membrane-Electrode Assemblies and Enhanced Selectivity	751
V.C.1	New Electrocatalysts for Fuel Cells.	770
V.C.11	Advanced Catalysts for Fuel Cells.	813
V.G.8	Investigation Failure in Polymer-Electrolyte Fuel Cells	899
VI.A.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	960
VI.A.4	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	963
VI.A.5	California Hydrogen Infrastructure Project	966
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle.	970
VI.C.2	Hydrogen Power Park - Business Opportunities Concept Project	989
VI.D.1	Storage of Hydrogen in Cryogenic Capable Pressure Vessels	1000
VI.E.3	Chattanooga Fuel Cell Demonstration Project	1010
VI.G.2	Power Parks System Simulation	1026
VI.G.3	Technology Validation: Fuel Cell Bus Evaluations.	1030
VII.2	Hydrogen Codes and Standards	1045
VII.3	Hydrogen Safety, Codes and Standards R&D	1050
VII.6	IEA Hydrogen Task 18: Evaluation of Integrated Demonstration Systems.	1066
VII.8	Hydrogen Safety Review Panel	1075
VIII.5	Validation of “idealized city” Models for H2 Delivery in Urban Areas, with Real-City Data	1097
VIII.9	Macro-System Model	1111
IX.5	Hydrogen Technology and Energy Curriculum (HyTEC)	1143

Colorado

II.A.10	Distributed Bio-Oil Reforming	54
II.B.6	Control of Catalyst Poisons from Coal Gasifiers	74
II.C.6	Cost-Effective Method for Producing Self-Supporting Pd Alloy Membrane for Use in the Efficient Production of Coal-derived Hydrogen	99
II.C.9	High Performance Palladium-Based Membrane	106
II.E.2	Biological Systems for Hydrogen Photoproduction	120
II.E.4	Fermentation Approaches to Hydrogen Production	128
II.F.2	Photoelectrochemical Systems for H ₂ Production	136
II.F.6	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen	149
II.F.7	Photoelectrochemical Hydrogen Production	154
II.F.9	Photoelectrochemical Hydrogen Production: SHGR Program Subtask	161
II.F.11	University of Nevada Reno Photo-Electrochemical Project	170
II.H.3	Renewable Electrolysis Integrated System Development and Testing	196
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	210
II.I.2	Fundamentals of a Solar-thermal Hydrogen Production Process Using a Metal-Oxide Based Thermochemical Water Splitting Cycle	216
III.C.2	Hydrogen Delivery Infrastructure Options Analysis	254
IV.A.1	High Density Hydrogen Storage System Demonstration Using NaAlH ₄ Based Complex Compound Hydrides	281
IV.C.1	DOE Carbon-Based Hydrogen Storage Center of Excellence	441
IV.C.1f	Research and Coordination Activities within the DOE Center of Excellence on Carbon-based Hydrogen Storage Materials	462
IV.G.5	Purdue Hydrogen Technology Program	582
IV.I.11	Molecular Hydrogen Storage in Novel Binary Clathrate Hydrates at Near-Ambient Temperatures and Pressures	629
V.A.2	Advanced MEAs for Enhanced Operating Conditions	692
V.B.8	Advanced Fuel Cell Membranes Based on Heteropolyacids	731
V.B.13	Lead Research and Development Activity for DOE's High Temperature, Low Relative Humidity Membrane Program	745
V.B.15	Novel Approaches to Immobilized Heteropoly Acid (HPA) Systems for High Temperature, Low Relative Humidity Polymer-Type Membranes	749
V.D.4	Corrosion Protection of Metallic Bipolar Plates for Fuel Cells	833
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle	970
VI.G.1	Controlled Hydrogen Fleet and Infrastructure Analysis	1020
VI.G.3	Technology Validation: Fuel Cell Bus Evaluations	1030
VII.2	Hydrogen Codes and Standards	1045
VIII.2	Moving Toward Consistent Analysis in the HFCIT Program: H ₂ A	1085
VIII.4	Energy Systems Analysis: HyDS Modeling Environment	1093
VIII.9	Macro-System Model	1111
VIII.12	Geographically-Based Hydrogen Consumer Demand and Infrastructure Analysis	1124

Connecticut

II.C.5	Advanced Water-Gas-Shift Membrane Reactor	97
II.D.1	Startech Hydrogen Production	110
II.D.2	A Novel Slurry-Based Biomass Reforming Process	114
II.H.4	VERmont Hydrogen Electrolyzer Project	201
III.B.1	Combined Reverse-Brayton Joule-Thompson Hydrogen Liquefaction Cycle	248

Connecticut (Continued)

IV.A.1	High Density Hydrogen Storage System Demonstration Using NaAlH ₄ Based Complex Compound Hydrides	281
IV.A.3	Complex Hydride Compounds with Enhanced Hydrogen Storage Capacity	289
IV.A.5	Effects and Mechanisms of Mechanical Activation on Hydrogen Sorption/Desorption of Nanoscale Lithium Nitrides	365
V.B.3	Enabling Commercial PEM Fuel Cells with Breakthrough Lifetime Improvements	706
V.B.4	Development of a Low-Cost, Durable Membrane and Membrane Electrode Assembly for Stationary and Mobile Fuel Cell Application	713
V.B.17	High Temperature Membrane With Humidification-Independent Cluster Structure	755
V.D.1	Scale-Up of Carbon/Carbon Bipolar Plates	818
V.G.11	PEM Fuel Cell Freeze Durability and Cold Start Project	910
VI.A.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	960
VI.E.2	Validation of an Integrated Hydrogen Energy Station	1006
VI.F.1	Hydrogen Filling Station	1015
VII.2	Hydrogen Codes and Standards	1045
VII.8	Hydrogen Safety Review Panel	1075

Delaware

IV.B.2	Chemical Hydride Slurry for Hydrogen Production and Storage	377
IV.G.6	Center for Hydrogen Storage Research at Delaware State University	584
V.A.1	Integrated Manufacturing for Advanced Membrane Electrode Assemblies	687
V.B.3	Enabling Commercial PEM Fuel Cells with Breakthrough Lifetime Improvements	706
V.C.5	Development of High-Performance, Low-Pt Cathodes Containing New Catalysts and Layer Structure	787
V.E.1	Platinum Recycling Technology Development	842

Florida

II.E.6	Photobiological Hydrogen Production	133
IV.G.2	Fuel Cell and Hydrogen Research - 2006 Annual Report	561
V.A.2	Advanced MEAs for Enhanced Operating Conditions	692
V.B.6	MEA and Stack Durability for PEM Fuel Cells	722
V.B.13	Lead Research and Development Activity for DOE's High Temperature, Low Relative Humidity Membrane Program	745
VII.8	Hydrogen Safety Review Panel	1075

Georgia

III.A.3	Materials Solutions for Hydrogen Delivery in Pipelines	235
IV.I.18	First-Principles Studies of Phase Stability and Reaction Dynamics in Complex Metal Hydrides	652
IV.I.21	Integrated Nanoscale Metal Hydride - Catalyst Architectures for Hydrogen Storage	663
V.B.4	Development of a Low-Cost, Durable Membrane and Membrane Electrode Assembly for Stationary and Mobile Fuel Cell Application	713
V.G.8	Investigation Failure in Polymer-Electrolyte Fuel Cells	899
VIII.7	Impact of Hydrogen Production on U.S. Energy Markets	1105

Hawaii

II.F.7	Photoelectrochemical Hydrogen Production	154
II.F.9	Photoelectrochemical Hydrogen Production: SHGR Program Subtask	161

Hawaii (Continued)

IV.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods	285
IV.A.4m	Fundamental Studies of Advanced High-Capacity, Reversible Metal Hydrides	347
V.B.4	Development of a Low-Cost, Durable Membrane and Membrane Electrode Assembly for Stationary and Mobile Fuel Cell Application	713

Idaho

II.G.1	Laboratory-Scale High Temperature Electrolysis System	173
II.G.2	Sulfur-Iodine Thermochemical Cycle	178
II.G.4	Nuclear Reactor/Hydrogen Process Interface	186

Illinois

II.A.3	Hydrogen Generation from Biomass-Derived Carbohydrates via the Aqueous-Phase Reforming (APR) Process	29
II.A.9	Integrated Short Contact Time Hydrogen Generator (SCPO)	50
II.A.11	High Pressure Distributed Ethanol Reforming	58
II.C.1	Single Membrane Reactor Configuration for Separation of Hydrogen, Carbon Dioxide, and Hydrogen Sulfide	91
II.G.3	High Temperature Thermochemical Processes	182
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	210
III.A.5	Hydrogen Embrittlement of Pipeline Steels: Causes and Remediation	243
III.C.1	H2A Delivery Analysis	251
III.C.2	Hydrogen Delivery Infrastructure Options Analysis	254
III.C.3	Forecourt Storage and Compression Options	258
IV.A.1	High Density Hydrogen Storage System Demonstration Using NaAlH ₄ Based Complex Compound Hydrides	281
IV.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods	285
IV.A.3	Complex Hydride Compounds with Enhanced Hydrogen Storage Capacity	289
IV.A.4n	Reversible Hydrogen Storage Materials – Structure, Chemistry and Electronic Structure	351
IV.C.2	Electron-Charged Graphite-Based Hydrogen Storage Material	491
IV.F.3	System Level Analysis of Hydrogen Storage Options	541
IV.I.23	First Principles Based Simulation of Hydrogen Interactions in Complex Hydrides	668
IV.I.24	Dehydrogenation of Boron-Nanoclusters	672
V.A.2	Advanced MEAs for Enhanced Operating Conditions	692
V.B.2	High-Temperature Polymer Electrolyte Membranes	703
V.C.6	Non-Platinum Electrocatalysts	791
V.G.1	Fuel Cell Systems Analysis	870
V.G.7	Fuel Cell Testing	896
V.G.12	Sub-Freezing Start-Up of a Fuel Cell	913
V.G.13	Impurity Effects on Membrane-Electrode Assembly Components	917
V.G.14	Electrode Stability	920
VI.A.1	Hydrogen to the Highways	951
VI.A.2	Ford & BP Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	956
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle	970
VI.B.3	Development of a Natural Gas to Hydrogen Fuel Station	981

Illinois (Continued)

VI.H.1 Evaluation of Technical Feasibility of Homogeneous Charge Compression Ignition (HCCI) Engine Fueled with Hydrogen, Natural Gas, and DME1035

VII.2 Hydrogen Codes and Standards 1045

VIII.10 Well-to-Wheels Analysis with the GREET Model1115

VIII.11 Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System 1120

Iowa

II.B.10 Development of a Catalyst/Sorbent for Methane Reforming81

IV.G.5 Purdue Hydrogen Technology Program582

IV.I.10 Complex Hydrides - A New Frontier for Future Energy Applications.....625

Kansas

V.E.2 Platinum Group Metal Recycling Technology Development846

VI.H.3 Performance, Reliability, and Emissions Characterization of Reciprocating Internal Combustion Engines Fueled with Hydrogen/Natural Gas Blends..... 1038

Kentucky

II.A.7 Low-Cost Hydrogen Distributed Production System Development.....42

II.B.12 Production and Storage of Hydrogen from Coal Using C1 Chemistry.....84

II.B.13 Reducing Ultra-Clean Transportation Fuel Costs with HyMelt Hydrogen86

II.B.15 Separation of Fischer-Tropsch Wax Products from Ultra-Fine Iron Catalysts Particles89

III.A.3 Materials Solutions for Hydrogen Delivery in Pipelines235

Louisiana

III.A.3 Materials Solutions for Hydrogen Delivery in Pipelines235

IV.A.3 Complex Hydride Compounds with Enhanced Hydrogen Storage Capacity289

IV.I.20 Understanding the Role (and Controlling the Behavior) of Transition Metal Dopants in NaAlH₄ Systems.....659

IV.I.22 The Molecular Design Basis for Hydrogen Storage in Clathrate Hydrates666

IX.7 Shared Technology Transfer Program (STTP)1149

Maryland

II.E.5 Hydrogen from Water in a Novel Recombinant Oxygen-Tolerant Cyanobacteria System131

II.H.5 Alkaline, High Pressure Electrolysis204

IV.A.4g Neutron Scattering Characterization and Thermodynamic Modeling of Advanced Metal Hydrides for Reversible Hydrogen Storage323

IV.C.1e Neutron Scattering Characterization of Carbon Based Hydrogen Storage Materials.....459

V.G.2 Neutron Imaging Study of the Water Transport in Operating Fuel Cells.....875

VII.7 Management of International Energy Agency (IEA) Hydrogen Implementing Agreement (HIA) Secretariat1070

VII.8 Hydrogen Safety Review Panel1075

VIII.6 Hydrogen Production Infrastructure Options Analysis1102

IX.6 H2 Educate! - Hydrogen Education for Middle Schools.....1146

IX.9 Increasing “H2IQ”: A Public Information Program1156

Massachusetts

II.B.2	Robust Low-Cost Water Gas Shift Membrane Reactor for High-Purity Hydrogen Production from Coal-Derived Syngas68
II.G.4	Nuclear Reactor/Hydrogen Process Interface	186
II.H.1	Low-Cost, High-Pressure Hydrogen Generator	190
III.C.2	Hydrogen Delivery Infrastructure Options Analysis	254
IV.B.2	Chemical Hydride Slurry for Hydrogen Production and Storage	377
IV.B.4c	Novel Approaches to Hydrogen Storage: Conversion of Borates to Boron Hydrides	402
IV.C.3	Nanostructured Activated Carbon for Hydrogen Storage	495
IV.F.2	Cost Analysis of Hydrogen Storage Systems	535
IV.I.5	Addressing Grand Challenges Through Advanced Materials	605
IV.I.9	High Throughput Screening of Nanostructured Hydrogen Storage Materials	621
V.A.1	Integrated Manufacturing for Advanced Membrane Electrode Assemblies	687
V.B.19	Dimensionally Stable High Performance Membrane	758
V.B.21	Dimensionally Stable High Temperature Membranes (New Project)	762
V.C.2	Novel Non-Precious Metal Catalysts for PEMFC: Catalyst Selection through Molecular Modeling and Durability Studies	774
V.D.3	Development of Low-Cost, Clad Metal Bipolar Plates for PEM Fuel Cells	827
V.F.5	Cost-Effective, High-Efficiency, Advanced Reforming Module	866
V.G.9	Cost Analyses of Fuel Cell Stack/Systems	903
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle	970
VII.2	Hydrogen Codes and Standards	1045
VII.8	Hydrogen Safety Review Panel	1075

Michigan

II.C.7	High Flux Metallic Membranes for Hydrogen Recovery and Membrane Reactors	101
II.F.6	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen	149
IV.A.2	Discovery of Novel Complex Metal Hydrides for Hydrogen Storage through Molecular Modeling and Combinatorial Methods	285
IV.C.1k	Hydrogen Storage in Graphite Nanofibers and the Spillover Mechanism	484
IV.F.1	National Testing Laboratory for Solid-State Hydrogen Storage Technologies	529
V.H.1	Center for Intelligent Fuel Cell Materials Design	930
V.H.2	Advanced Manufacturing Technologies for Hydrogen Energy Systems	932
VI.A.1	Hydrogen to the Highways	951
VI.A.2	Ford & BP Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	956
VI.A.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	960
VI.A.4	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	963
VI.C.1	DTE Energy Hydrogen Technology Park	985
VI.C.3	NextEnergy Microgrid and Hydrogen Fueling Facility	996
VIII.11	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System	1120
IX.3	Hydrogen/Alternative Energy Center	1137

Minnesota

II.A.9	Integrated Short Contact Time Hydrogen Generator (SCPO)	50
V.A.2	Advanced MEAs for Enhanced Operating Conditions	692
V.B.5	Development of Polybenzimidazole-based High Temperature Membrane and Electrode Assemblies for Stationary Applications	718

Minnesota (Continued)

V.B.6	MEA and Stack Durability for PEM Fuel Cells	722
V.B.15	Novel Approaches to Immobilized Heteropoly Acid (HPA) Systems for High Temperature, Low Relative Humidity Polymer-Type Membranes	749
V.C.9	Novel Approach to Non-Precious Metal Catalysts	805

Mississippi

IV.C.1j	Optimization of SWNT Production and Theoretical Models of H ₂ -SWNT Systems for Hydrogen Storage	482
V.B.3	Enabling Commercial PEM Fuel Cells with Breakthrough Lifetime Improvements	706
V.B.23	Characterization of PEMFC Membrane Durability: Changes in Physical Properties of Nafion® Membranes after Chemical Degradation	766

Missouri

II.A.2	A Reversible Planar Solid Oxide Fuel-Assisted Electrolysis Cell and Solid Oxide Fuel Cell for Hydrogen and Electricity Production Operating on Natural Gas/Biogas	24
IV.D.4	Glass Microspheres for Hydrogen Storage	518
IV.I.7	In-situ Neutron Diffraction Studies of Novel Hydrogen Storage Materials.	613
IV.I.8	In Situ NMR Studies of Hydrogen Storage Systems	617
IV.I.19	Crystal and Electronic Structures of LiNH ₂ and Related Compounds	656
IV.I.25	NMR Studies of Metal-Hydrides: MgScH _x	676
IV.J.1	Hydrogen Absorption in Gamma Irradiated Carbon and Other Materials	680
VII.8	Hydrogen Safety Review Panel	1075

Montana

IX.4	Hydrogen Futures Park at The University of Montana	1140
------	--	------

Nevada

II.F.9	Photoelectrochemical Hydrogen Production: SHGR Program Subtask	161
II.F.11	University of Nevada Reno Photo-Electrochemical Project	170
II.G.4	Nuclear Reactor/Hydrogen Process Interface	186
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	210
IV.A.40	Effect of Gaseous Impurities on Long-Term Thermal Cycling and Aging Properties of Complex Hydrides for Hydrogen Storage.	354
IV.G.4	Fundamental Research for Optimization of Hydrogen Storage and Utilization	575
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle.	970
VI.C.2	Hydrogen Power Park - Business Opportunities Concept Project	989
VI.E.1	Research and Development of a PEM Fuel Cell, Hydrogen Reformer, and Vehicle Refueling Facility.	1003
VI.F.1	Hydrogen Filling Station	1015

New Jersey

II.A.5	Integrated Hydrogen Production, Purification and Compression System	36
IV.B.1	Process for Regeneration of Sodium Borate to Sodium Borohydride for Use as a Hydrogen Storage Source	372
IV.B.4d	Development of an Advanced Chemical Hydrogen Storage and Generation System	406
V.A.1	Integrated Manufacturing for Advanced Membrane Electrode Assemblies.	687
V.E.2	Platinum Group Metal Recycling Technology Development	846
VI.A.1	Hydrogen to the Highways	951
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle.	970

New Mexico

II.C.8	Zeolite Membrane Based Shift Reactor	102
II.I.1	Development of Solar-Powered Thermochemical Production of Hydrogen from Water	210
IV.B.4	DOE Chemical Hydrogen Storage Center of Excellence	386
IV.B.4a	Chemical Hydrogen Storage Research at Los Alamos National Laboratory	393
V.A.3	Electrocatalyst Supports and Electrode Structures	698
V.B.7	Non-Nafion Membrane Electrode Assemblies	727
V.B.9	Hydrocarbon Membrane	735
V.B.10	High Temperature/Low Humidity Polymer Electrolytes Derived from Ionic Liquids	739
V.C.5	Development of High-Performance, Low-Pt Cathodes Containing New Catalysts and Layer Structure	787
V.C.7	Non-Platinum Cathode Catalysts	794
V.F.3	Residential Fuel Cell Demonstration by the Delaware County Electric Cooperative, Inc.	859
V.G.4	PEM Fuel Cell Durability	884
V.G.5	Component Benchmarking Subtask Reported: Single Cell Testing Second Round Update and Technical Assistance to Industrial and University Partners	889
V.G.6	Applied Science for Performance, Cost and Durability	892
V.G.10	Effect of Fuel and Air Impurities on Fuel Cell Performance	905
V.G.17	Sub-Freezing Fuel Cell Effects	926
VII.4	International Projects	1060
IX.6	H2 Educate! - Hydrogen Education for Middle Schools	1146

New York

II.A.1	Autothermal Cyclic Reforming Based Hydrogen Generating and Dispensing System	21
II.A.6	Integrated Ceramic Membrane System for Hydrogen Production	40
II.A.8	Low Cost Hydrogen Production Platform	45
II.A.9	Integrated Short Contact Time Hydrogen Generator (SCPO)	50
II.B.4	Integrated High Temperature Coal-to-Hydrogen System with CO ₂ Separation	71
II.C.9	High Performance Palladium-Based Membrane	106
II.F.5	Solar Water Splitting: Photocatalyst Materials Discovery and Systems Development	147
II.H.2	New York State Hi-Way Initiative	194
III.A.3	Materials Solutions for Hydrogen Delivery in Pipelines	235
IV.A.4a	Synthesis and Properties of Aluminum Hydride as a Hydrogen Storage Material	297
IV.A.4c	Lightweight Intermetallics for Hydrogen Storage	304
IV.B.4c	Novel Approaches to Hydrogen Storage: Conversion of Borates to Boron Hydrides	402
IV.C.3	Nanostructured Activated Carbon for Hydrogen Storage	495
IV.D.4	Glass Microspheres for Hydrogen Storage	518
IV.I.6	Atomistic Transport Mechanisms in Reversible Complex Metal Hydrides	609
V.B.5	Development of Polybenzimidazole-based High Temperature Membrane and Electrode Assemblies for Stationary Applications	718
V.B.6	MEA and Stack Durability for PEM Fuel Cells	722
V.B.18	Design and Development of High-Performance Polymer Fuel Cell Membranes	756
V.B.21	Dimensionally Stable High Temperature Membranes	762
V.C.4	Low Pt Loading Fuel Cell Electrocatalysts	783
V.F.1	Back-up/Peak-Shaving Fuel Cell Systems	854
V.F.3	Residential Fuel Cell Demonstration by the Delaware County Electric Cooperative, Inc.	859
VI.A.4	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	963

New York (Continued)

VI.E.1	Research and Development of a PEM Fuel Cell, Hydrogen Reformer, and Vehicle Refueling Facility	1003
VII.2	Hydrogen Codes and Standards	1045
VIII.7	Impact of Hydrogen Production on U.S. Energy Markets	1105

North Carolina

II.A.6	Integrated Ceramic Membrane System for Hydrogen Production	40
II.B.7	Co-Production of Electricity and Hydrogen Using a Novel Iron-Based Catalyst	76
II.B.9	Co-Production of Substitute Natural Gas/Electricity via Catalytic Coal Gasification	79
IV.B.5	Development of Regenerable High Capacity Boron Nitrogen Hydrides as Hydrogen Storage Materials	437
IV.C.1c	Controlling the Diameter of Single Walled Carbon Nanotubes for Hydrogen Storage	455
IV.C.11	Characterization of Hydrogen Adsorption in Carbon-Based Materials by NMR	486
V.B.9	Hydrocarbon Membrane	735
V.B.13	Lead Research and Development Activity for DOE's High Temperature, Low Relative Humidity Membrane Program.	745
V.D.1	Scale-Up of Carbon/Carbon Bipolar Plates	818

North Dakota

II.B.9	Co-Production of Substitute Natural Gas/Electricity via Catalytic Coal Gasification	79
II.B.14	National Center for Hydrogen Technology.	88
II.D.2	A Novel Slurry-Based Biomass Reforming Process	114

Ohio

II.A.12	Investigation of Reaction Networks and Active Sites In Bio-Ethanol Steam Reforming Over Co-Based Catalysts	61
II.C.4	Enhanced Hydrogen Production Integration with Carbon Dioxide Separation in a Single-State Reactor	96
II.C.8	Zeolite Membrane Based Shift Reactor	102
II.F.6	Critical Research for Cost-Effective Photoelectrochemical Production of Hydrogen.	149
II.F.10	Production of Hydrogen for Clean and Renewable Sources of Energy for Fuel Cell Vehicles.	166
V.A.1	Integrated Manufacturing for Advanced Membrane Electrode Assemblies.	687
V.A.2	Advanced MEAs for Enhanced Operating Conditions	692
V.B.1	Poly(p-Phenylene Sulfonic Acid)s with Frozen-in Free Volume for use in High Temperature Fuel Cells.	702
V.B.6	MEA and Stack Durability for PEM Fuel Cells	722
V.B.9	Hydrocarbon Membrane	735
V.B.12	NanoCapillary Network Proton Conducting Membranes for High Temperature Hydrogen/Air Fuel Cells.	743
V.B.14	Protic Salt Polymer Membranes: High-Temperature Water-Free Proton-Conducting Membranes	747
V.C.2	Novel Non-Precious Metal Catalysts for PEMFC: Catalyst Selection through Molecular Modeling and Durability Studies.	774
V.C.8	Development of Transition Metal/Chalcogen Based Cathode Catalysts for PEM Fuel Cells	799
V.F.2	Economic and Marketing Analysis of Stationary and Near-term Markets for PEM Fuel Cell Systems	859
V.H.1	Center for Intelligent Fuel Cell Materials Design.	930
V.H.3	Developing Improved Materials to Support the Hydrogen Economy	937
VI.G.3	Technology Validation: Fuel Cell Bus Evaluations.	1030

Ohio (Continued)

VII.2	Hydrogen Codes and Standards	1045
VII.8	Hydrogen Safety Review Panel	1075

Oregon

II.C.6	Cost-Effective Method for Producing Self-Supporting Pd Alloy Membrane for Use in the Efficient Production of Coal-derived Hydrogen	99
III.A.3	Materials Solutions for Hydrogen Delivery in Pipelines	235

Pennsylvania

II.B.3	Novel Sorption Enhanced Reaction Process for Simultaneous Production of Carbon Dioxide and Hydrogen from Synthesis Gas Produced by Coal Gasification	69
II.C.3	Hydrogen Production via Commercially Ready Inorganic Membrane Reactor	94
II.F.7	Photoelectrochemical Hydrogen Production	154
III.A.3	Materials Solutions for Hydrogen Delivery in Pipelines	235
III.E.1	Hydrogen Regional Infrastructure Program in Pennsylvania	264
IV.A.4i	First-Principles Modeling of Hydrogen Storage in Metal Hydride Systems	329
IV.B.1	Process for Regeneration of Sodium Borate to Sodium Borohydride for Use as a Hydrogen Storage Source	372
IV.B.3	Design and Development of New Carbon-based Sorbent Systems for an Effective Containment of Hydrogen	382
IV.B.4c	Novel Approaches to Hydrogen Storage: Conversion of Borates to Boron Hydrides	402
IV.B.4e	Electrochemical Hydrogen Storage Systems	411
IV.B.4g	New Methods for Promoting Amineborane Dehydrogenation/Regeneration Reactions	418
IV.C.1a	Designing Microporous Carbons for Hydrogen Storage Systems	449
IV.C.1h	Advanced Boron and Metal-Loaded High Porosity Carbons	476
IV.C.1m	Conducting Polymers as New Materials for Hydrogen Storage	488
IV.C.4	Carbide-Derived Carbons with Tunable Porosity Optimized for Hydrogen Storage	500
IV.H.1	Microporous Metal Organic Materials for Hydrogen Storage	587
IV.I.1	Chemical Hydrogen Storage in Ionic Liquid Media	588
IV.I.3	From fundamental understanding to predicting new nanomaterials for high capacity hydrogen storage and fuel cell technologies	595
V.B.4	Development of a Low-Cost, Durable Membrane and Membrane Electrode Assembly for Stationary and Mobile Fuel Cell Application	713
V.B.24	New Proton Conductive Composite Materials with Co-Continuous Phases Using Functionalized and Crosslinkable TFE/VDF Fluoropolymers	769
V.C.10	Tungsten Cathode Catalyst for PEMFC	810
VI.A.5	California Hydrogen Infrastructure Project	966
VI.B.1	Novel Compression and Fueling Apparatus to Meet Hydrogen Vehicle Range Requirements	974
VI.B.2	Development of a Turnkey Hydrogen Fueling Station	978
VI.C.2	Hydrogen Power Park - Business Opportunities Concept Project	989
VI.E.1	Research and Development of a PEM Fuel Cell, Hydrogen Reformer, and Vehicle Refueling Facility	1003
VI.E.2	Validation of an Integrated Hydrogen Energy Station	1006
VI.H.2	Hydrogen-Assisted IC Engine Combustion as a Route to Hydrogen Implementation	1037
VII.8	Hydrogen Safety Review Panel	1075
VIII.11	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System	1120

Rhode Island

II.A.8	Low Cost Hydrogen Production Platform	45
--------	---------------------------------------	----

South Carolina

III.A.1	Hydrogen Permeability and Integrity of Hydrogen Transfer Pipelines	227
III.A.4	Evaluation of Natural Gas Pipeline Materials and Infrastructure for Hydrogen/Hythane Service	242
III.E.1	Hydrogen Regional Infrastructure Program in Pennsylvania	264
IV.A.3	Complex Hydride Compounds with Enhanced Hydrogen Storage Capacity	289
IV.A.4k	Development of Reversible Hydrogen Storage Alane	340
IV.A.6	Advanced Hydrogen Storage Materials Development	369
IV.G.1	Clean Energy Research	547
IV.I.14	Elucidation of Hydrogen Interaction Mechanisms With Metal-Doped Carbon Nanostructures	641
V.B.5	Development of Polybenzimidazole-based High Temperature Membrane and Electrode Assemblies for Stationary Applications	718
V.B.9	Hydrocarbon Membrane	735
V.B.20	Fluoroalkylphosphonic-Acid-Based Proton Conductors	760
V.C.2	Novel Non-Precious Metal Catalysts for PEMFC: Catalyst Selection through Molecular Modeling and Durability Studies	774
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle	970

Tennessee

II.C.2	Scale-up of Microporous Inorganic Hydrogen-Separation Membrane	93
II.C.9	High Performance Palladium-Based Membrane	106
II.E.3	Photobiological H ₂ Production Systems: Creation of Designer Alga for Efficient and Robust Production of H ₂ from Water	125
III.A.1	Hydrogen Permeability and Integrity of Hydrogen Transfer Pipelines	227
III.A.2	FRP Hydrogen Pipelines	231
III.A.3	Materials Solutions for Hydrogen Delivery in Pipelines	235
IV.A.4h	Novel Synthetic Approaches for the Preparation of Complex Hydrides for Hydrogen Storage	327
IV.C.1g	Synthesis and Processing of Single-Walled Carbon Nanohorns for Hydrogen Storage and Catalyst Supports	473
IV.I.12	Atomistic Mechanisms of Metal-Assisted Hydrogen Storage in Nanostructured Carbon	633
IV.I.15	Characterization of Carbon Nanostructures in Pd Containing Activated Carbon Fibers Using Aberration-Corrected STEM	644
IV.I.16	Theoretical Investigation of the Energetics of Hydrogen Interaction with Graphene Layers: The Effect of Interlayer Spacing on Hydrogen Storage	646
IV.I.17	Neutron Scattering Aided Studies of the Design, Synthesis and Thermodynamics of Molecular Hydrogen Adsorption Materials	648
V.B.11	Poly(cyclohexadiene)-Based Polymer Electrolyte Membranes for Fuel Cell Applications	741
V.D.2	Cost-Effective Surface Modification for Metallic Bipolar Plates	822
V.F.3	Residential Fuel Cell Demonstration by the Delaware County Electric Cooperative, Inc.	859
V.G.3	Microstructural Characterization of PEM Fuel Cell MEAs	878
VI.E.3	Chattanooga Fuel Cell Demonstration Project	1010
VIII.3	Hydrogen Transition Modeling and Analysis: HYTRANS	1088
IX.2	Baseline Knowledge Assessment of Hydrogen and Fuel Cells	1135

Texas

II.C.6	Cost-Effective Method for Producing Self-Supporting Pd Alloy Membrane for Use in the Efficient Production of Coal-derived Hydrogen.	99
II.F.7	Photoelectrochemical Hydrogen Production	154
III.C.2	Hydrogen Delivery Infrastructure Options Analysis	254
IV.C.1i	Cloning Single Wall Carbon Nanotubes for Hydrogen Storage	479
IV.F.1	National Testing Laboratory for Solid-State Hydrogen Storage Technologies	529
VI.A.3	Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project	960
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle.	970
VI.B.3	Development of a Natural Gas to Hydrogen Fuel Station	978
VIII.6	Hydrogen Production Infrastructure Options Analysis.	1102
IX.7	Shared Technology Transfer Program (STTP)	1149

Utah

II.A.2	A Reversible Planar Solid Oxide Fuel-Assisted Electrolysis Cell and Solid Oxide Fuel Cell for Hydrogen and Electricity Production Operating on Natural Gas/Biogas	24
II.B.8	Atomic-Scale Design of Cobalt Fischer-Tropsch Catalysts: A Combined Computational Chemistry, Experimental, and Microkinetics Modeling Approach.	78
II.G.1	Laboratory-Scale High Temperature Electrolysis System	173
II.G.4	Nuclear Reactor/Hydrogen Process Interface	186
III.E.1	Hydrogen Regional Infrastructure Program in Pennsylvania	264
IV.A.4p	Synthesis and Discovery of Nanocrystalline Reversible Hydrides by Vapor Phase Reactions.	361
V.B.20	Fluoroalkylphosphonic-Acid-Based Proton Conductors.	760

Vermont

II.H.3	Renewable Electrolysis Integrated System Development and Testing	196
II.H.4	EVermont Hydrogen Electrolyzer Project	201

Virginia

II.A.7	Low-Cost Hydrogen Distributed Production System Development.	42
III.E.1	Hydrogen Regional Infrastructure Program in Pennsylvania	264
V.B.9	Hydrocarbon Membrane	735
V.B.22	Advanced Materials for Proton Exchange Membranes	764
V.D.5	Economical High Performance Thermoplastic Composite Bipolar Plates (Small Business Technology Transfer Project)	838
V.E.2	Platinum Group Metal Recycling Technology Development	846
V.F.3	Residential Fuel Cell Demonstration by the Delaware County Electric Cooperative, Inc.	859
V.G.15	Mass Production Cost Estimation for Direct H2 PEM Fuel Cell System for Automotive Applications	923
VI.B.2	Development of a Turnkey Hydrogen Fueling Station	978
VII.2	Hydrogen Codes and Standards	1045
VIII.6	Hydrogen Production Infrastructure Options Analysis.	1102
VIII.7	Impact of Hydrogen Production on U.S. Energy Markets	1105
IX.6	H2 Educate! - Hydrogen Education for Middle Schools.	1146

Washington

II.A.4	Production of Hydrogen by Biomass Reforming	33
III.A.3	Materials Solutions for Hydrogen Delivery in Pipelines	235

Washington (Continued)

IV.A.5	Effects and Mechanisms of Mechanical Activation on Hydrogen Sorption/Desorption of Nanoscale Lithium Nitrides	365
IV.B.4b	PNNL Progress within the DOE Center of Excellence for Chemical Hydrogen Storage	398
IV.B.4h	Kinetic and Mechanistic Studies of B-N Hydrogenation/Dehydrogenation	422
IV.I.2	Control of Hydrogen Release and Uptake in Condensed Phases	592
V.D.3	Development of Low-Cost, Clad Metal Bipolar Plates for PEM Fuel Cells	827
IX.8	Hydrogen Safety Education and Training for Emergency Responders	1153

Washington, D.C.

II.A.7	Low-Cost Hydrogen Distributed Production System Development	42
V.C.3	Low-Platinum Catalysts for Oxygen Reduction at PEMFC Cathodes	779
VII.2	Hydrogen Codes and Standards	1045
VII.5	H2 Incident Reporting and Best Practices Database	1063
VII.8	Hydrogen Safety Review Panel	1075
VIII.8	Hydrogen Analysis Resource Center	1109
VIII.11	Analysis of the Hydrogen Production and Delivery Infrastructure as a Complex Adaptive System	1120
IX.8	Hydrogen Safety Education and Training for Emergency Responders	1153

Wisconsin

II.A.3	Hydrogen Generation from Biomass-Derived Carbohydrates via the Aqueous-Phase Reforming (APR) Process	29
II.B.8	Atomic-Scale Design of Cobalt Fischer-Tropsch Catalysts: A Combined Computational Chemistry, Experimental, and Microkinetics Modeling Approach	78
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle	970

Wyoming

II.B.1	The Integration of a Structural Water-Gas-Shift Catalyst with a Vanadium Alloy Hydrogen Transport Device	67
--------	--	----

Foreign Countries**Canada**

II.A.5	Integrated Hydrogen Production, Purification and Compression System	36
IV.B.2	Chemical Hydride Slurry for Hydrogen Production and Storage	377
V.A.2	Advanced MEAs for Enhanced Operating Conditions	692
V.C.5	Development of High-Performance, Low-Pt Cathodes Containing New Catalysts and Layer Structure	787
V.C.8	Development of Transition Metal/Chalcogen Based Cathode Catalysts for PEM Fuel Cells	799
V.C.9	Novel Approach to Non-Precious Metal Catalysts	805
VI.A.1	Hydrogen to the Highways	951
VI.A.6	Fuel Cell Powered Underground Mine Loader Vehicle	970
VI.B.2	Development of a Turnkey Hydrogen Fueling Station	978

Germany

V.B.5	Development of Polybenzimidazole-based High Temperature Membrane and Electrode Assemblies for Stationary Applications	718
VI.A.1	Hydrogen to the Highways	951

Norway

IV.A.3 Complex Hydride Compounds with Enhanced Hydrogen Storage Capacity 289

Russia

II.E.2 Biological Systems for Hydrogen Photoproduction.....120

IV.B.5 Development of Regenerable High Capacity Boron Nitrogen Hydrides as Hydrogen
Storage Materials437

South Korea

VI.A.3 Controlled Hydrogen Fleet and Infrastructure Demonstration and Validation Project 960