XVI. Project Listings by Organization

3M Company
   II.B.2 High-Performance, Long-Lifetime Catalysts for Proton Exchange Membrane Electrolysis
   V.A.7 Highly Active, Durable, and Ultra-Low PGM NSTF Thin Film ORR Catalysts and Supports
   V.A.8 Highly Accessible Catalysts for Durable High-Power Performance
   V.B.4 Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
   V.B.7 Fuel Cell Membrane Electrode Assemblies with Ultra-Low Pt Nanofiber Electrodes
   V.C.1 New Fuel Cell Membranes with Improved Durability and Performance
   V.C.2 Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications
   V.C.7 Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells

ACI Services
   III.2 Hydrogen Compression Application of the Linear Motor Reciprocating Compressor (LMRC)

Advent Technologies Inc.
   V.A.3 Innovative Non-PGM Catalysts for High-Temperature PEMFCs
   V.A.13 Development of Durable Active Supports for Low Platinum Group Metal Catalysts (SBIR I)
   V.D.2 Facilitated Direct Liquid Fuel Cells with High Temperature Membrane Electrode Assemblies

Air Liquide
   III.14 Advancing Hydrogen Dispenser Technology by Using Innovative Intelligent Networks
   VII.B.1 Innovative Advanced Hydrogen Mobile Fueler

Air Products and Chemicals, Inc.
   VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

ALD Nanosolutions
   V.A.6 Extended Surface Electrocatalyst Development

Altergy
   VI.1 Fuel Cell Membrane Electrode Assembly Manufacturing R&D

Ames Laboratory
   III.6 Magnetocaloric Hydrogen Liquefaction
   IV.C.13 High-Capacity Hydrogen Storage Systems via Mechanochemistry

Ardica Technologies, Inc.
   IV.C.17 Low-Cost α-Alane for Hydrogen Storage

Argonne National Laboratory
   II.A.1 Analysis of Advanced H₂ Production Pathways
   III.9 Hydrogen Refueling Analysis of Heavy-Duty Fuel Cell Vehicle Fleet
   III.15 H2FIRST Consolidation
   IV.A.1 System Analysis of Physical and Materials-Based Hydrogen Storage
   IV.A.2 Hydrogen Storage Cost Analysis
   IV.C.9 HyMARC Seedling: “Graphene-Wrapped” Complex Hydrides as High-Capacity, Regenerable Hydrogen Storage Materials
Argonne National Laboratory (Continued)
  V.A.1 ElectroCat (Electrocatalysis Consortium)
  V.A.4 Tailored High-Performance Low-PGM Alloy Cathode Catalysts
  V.A.7 Highly Active, Durable, and Ultra-Low PGM NSTF Thin Film ORR Catalysts and Supports
  V.B.1 FC-PAD: Fuel Cell Performance and Durability Consortium
  V.B.2 FC-PAD: Components and Characterization
  V.B.3 FC-PAD: Electrode Layers and Optimization
  V.B.4 Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
  V.C.6 Advanced Materials for Fully-Integrated MEAs in AEMFCs
  V.E.4 Performance and Durability of Advanced Automotive Fuel Cell Stacks and Systems with Dispersed Alloy Cathode Catalyst in Membrane Electrode Assemblies
  V.E.5 Fuel Cell Vehicle Cost Analysis
  VII.D.1 H2@Scale Analysis
  IX.1 Employment Impacts of Hydrogen and Fuel Cell Technologies
  IX.2 Regional Water Stress Analysis with Hydrogen Production at Scale
  IX.3 Cost Benefits Analysis of Technology Improvement in Light-Duty Fuel Cell Vehicles
  IX.8 Greenhouse Gas (GHG) Emissions and Petroleum Use Reduction of Medium- and Heavy-Duty Trucks
  IX.9 Agent-Based Modeling of Consumer Behavior
  IX.10 Life-Cycle Analysis of Air Pollutants Emission for Refinery and Hydrogen Production from SMR
  IX.12 Benefits Analysis of Multi-Fuel/Vehicle Platforms with a Focus on Hydrogen Fuel Cell Electric Vehicles

Arizona State University
  II.C.1 High Efficiency Solar Thermochemical Reactor for Hydrogen Production

Aspen Aerogels
  IV.D.4 Integrated Insulation System for Automotive Cryogenic Storage Tanks

Automated Dynamics
  VI.5 Continuous Fiber Composite Electrofusion Coupler

A.V. Tchouvelev & Associates, Inc.
  VIII.1 National Codes and Standards Development and Outreach
  VIII.7 NREL Hydrogen Sensor Testing Laboratory

Ballard Power Systems
  X.4 Demonstration of Fuel Cell Auxiliary Power Unit (APU) to Power Truck Refrigeration Units (TRUs) in Refrigerated Trucks

Becht Engineering
  VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

Birch Studio

Bloomfield Automation
  VIII.7 NREL Hydrogen Sensor Testing Laboratory

Breakthrough Technologies Institute
Brookhaven National Laboratory
II.F.6  Reversible Conversion between CO₂/H₂ and Formic Acid by Molecular Catalysts
V.A.5  Platinum Monolayer Electrocatalysts

Brown University
V.A.16  Advanced Electro-Catalysts through Crystallographic Enhancement

Bucknell University
II.C.1  High Efficiency Solar Thermochemical Reactor for Hydrogen Production

Business Council on Climate Change
VIII.11  Advancing Fuel Cell Electric Vehicles in San Francisco and Beyond

California Institute of Technology
II.D.3  Tandem Particle-Slurry Batch Reactors for Solar Water Splitting
IV.C.14  Design and Synthesis of Materials with High Capacities for Hydrogen Physisorption

Cardinal Rubber & Seal
III.8  Cryogenically Flexible, Low Permeability H₂ Delivery Hose

Carnegie Mellon University
V.A.8  Highly Accessible Catalysts for Durable High-Power Performance

CEA-Liten
VIII.3  Hydrogen Fuel Quality

Center for Clean Energy Engineering
V.A.15  Highly Robust Low PGM MEAs Based upon Composite Supports (SBIR I)

Center for Transportation and the Environment
IV.D.1  Conformable Hydrogen Storage Coil Reservoir
VII.A.3  Fuel Cell Hybrid Electric Delivery Van Project

Ceramatec, Inc.
II.B.8  Multi-Scale Ordered Cell Structure for Cost Effective Production of Hydrogen by HTWS

CertainTech Inc.
V.A.12  Mesoporous Non-Carbon Catalyst Supports of PEMFC (SBIR I)

City and County of San Francisco
VIII.11  Advancing Fuel Cell Electric Vehicles in San Francisco and Beyond

City of Santa Fe Springs
VIII.6  Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

Colorado School of Mines
II.C.1  High Efficiency Solar Thermochemical Reactor for Hydrogen Production
V.A.6  Extended Surface Electrocatalyst Development
V.C.2  Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications
V.C.7  Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells
VI.1  Fuel Cell Membrane Electrode Assembly Manufacturing R&D
Connecticut Center for Advanced Technology
   VI.2 Clean Energy Supply Chain and Manufacturing Competitiveness Analysis for Hydrogen and Fuel Cell Technologies

Cornell University
   V.A.8 Highly Accessible Catalysts for Durable High-Power Performance

C P Industries
   III.3 Low Cost Hydrogen Storage at 875 bar Using Steel Liner and Steel Wire Wrap

CSA Group
   VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

DJW Technology, LLC
   VI.2 Clean Energy Supply Chain and Manufacturing Competitiveness Analysis for Hydrogen and Fuel Cell Technologies
   VI.4 U.S. Clean Energy Hydrogen and Fuel Cell Technologies: A Competitiveness Analysis

Drexel University
   V.A.8 Highly Accessible Catalysts for Durable High-Power Performance

E4tech
   VI.4 U.S. Clean Energy Hydrogen and Fuel Cell Technologies: A Competitiveness Analysis

Eastern Research Group, Inc.
   IX.10 Life-Cycle Analysis of Air Pollutants Emission for Refinery and Hydrogen Production from SMR

Electricore, Inc.
   VII.B.1 Innovative Advanced Hydrogen Mobile Fueler

Element One
   VIII.7 NREL Hydrogen Sensor Testing Laboratory

Emerald Energy NW LLC
   III.6 Magnetocaloric Hydrogen Liquefaction

Energy Florida
   IV.D.4 Integrated Insulation System for Automotive Cryogenic Storage Tanks

eT2M
   V.A.3 Innovative Non-PGM Catalysts for High-Temperature PEMFCs

EWII Fuel Cells LLC
   V.A.2 Development of PGM-Free Catalysts for Hydrogen Oxidation Reaction in Alkaline Media
   V.A.16 Advanced Electro-Catalysts through Crystallographic Enhancement
   V.A.17 Vapor Deposition Process for Engineering of Dispersed PEMFC ORR Pt/NbO_x/C Catalysts
   V.B.2 FC-PAD: Components and Characterization

Exothermics, Inc.
   V.A.17 Vapor Deposition Process for Engineering of Dispersed PEMFC ORR Pt/NbO_x/C Catalysts
Federal Express Corporation  
X.5 FedEx Express Hydrogen Fuel Cell Extended-Range Battery Electric Vehicles

Firexpro  
VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

Florida State University  
VII.C.3 Dynamic Modeling and Validation of Electrolyzers in Real-Time Grid Simulation

Ford Motor Company  
IV.C.15 Hydrogen Adsorbents with High Volumetric Density: New Materials and System Projections  
V.A.17 Vapor Deposition Process for Engineering of Dispersed PEMFC ORR Pt/NbO2/C Catalysts  
VIII.9 Compatibility of Polymeric Materials Used in the Hydrogen Infrastructure

Forge Nano  
V.A.15 Highly Robust Low PGM MEAs Based upon Composite Supports (SBIR I)

Frontier Energy  
VIII.11 Advancing Fuel Cell Electric Vehicles in San Francisco and Beyond

Fuel Cell & Hydrogen Energy Association  
VIII.8 Fuel Cell & Hydrogen Energy Association Codes and Standards Support

FuelCell Energy, Inc.  
II.B.5 Solid Oxide Based Electrolysis and Stack Technology with Ultra-High Electrolysis Current Density (>3 A/cm2) and Efficiency  
V.C.3 Smart Matrix Development for Direct Carbonate Fuel Cell  
VII.C.4 Modular SOEC System for Efficient Hydrogen Production at High Current Density

Gaia Energy Research Institute LLC  
II.B.8 Multi-Scale Ordered Cell Structure for Cost Effective Production of Hydrogen by HTWS  
III.11 Electrochemical Compression

Gas Technology Institute  
VII.B.3 Performance Evaluation of Delivered Hydrogen Fueling Stations

General Motors  
V.A.8 Highly Accessible Catalysts for Durable High-Power Performance  
V.B.2 FC-PAD: Components and Characterization  
V.B.5 Durable High-Power Membrane Electrode Assemblies with Low Pt Loading  
V.C.1 New Fuel Cell Membranes with Improved Durability and Performance  
VI.1 Fuel Cell Membrane Electrode Assembly Manufacturing R&D

Georgia Institute of Technology  
II.B.6 Economical Production of Hydrogen through Development of Novel, High Efficiency Electrocatalysts for Alkaline Membrane Electrolysis  
V.B.7 Fuel Cell Membrane Electrode Assemblies with Ultra-Low Pt Nanofiber Electrodes  
VI.1 Fuel Cell Membrane Electrode Assembly Manufacturing R&D  
VI.6 In-line Quality Control of PEM Materials
Giner, Inc.
   II.B.2 High-Performance, Long-Lifetime Catalysts for Proton Exchange Membrane Electrolysis
   II.B.4 High Temperature Alkaline Water Electrolysis
   III.11 Electrochemical Compression
   V.A.10 Regenerative Fuel Cell System (SBIR Phase II)
   V.B.5 Durable High-Power Membrane Electrode Assemblies with Low Pt Loading
   V.C.4 Ionomer Dispersion Impact on Fuel Cell and Electrolyzer Performance and Durability (SBIR Phase II TTO)
   V.D.3 Advanced Catalysts and Membrane Electrode Assemblies (MEAs) for Reversible Alkaline Membrane Fuel Cells

GLWN, Westside Industrial Retention & Expansion Network
   VI.4 U.S. Clean Energy Hydrogen and Fuel Cell Technologies: A Competitiveness Analysis

Greenway Energy, LLC
   III.12 Hybrid Electrochemical Hydrogen/Metal Hydride Compressor
   V.A.11 Development of Corrosion Resistant Carbon (CRC) Support for Ultra-Low Platinum Group Metal (PGM) Catalysts (SBIR Phase I)

GVD Corporation
   III.4 Advanced Barrier Coatings for Harsh Environments

GWS Solutions of Tolland LLC
   VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

Hawaii Hydrogen Carriers LLC
   III.13 Metal Hydride Compression

Hawaii Natural Energy Institute
   V.D.1 Novel Structured Metal Bipolar Plates for Low Cost Manufacturing
   X.1 Hydrogen Energy Systems as a Grid Management Tool

Hexagon Lincoln
   IV.D.4 Integrated Insulation System for Automotive Cryogenic Storage Tanks

High Energy Coil Reservoirs, LLC
   IV.D.1 Conformable Hydrogen Storage Coil Reservoir

HRL Laboratories, LLC
   IV.C.7 HyMARC Seedling: Electrolyte Assisted Hydrogen Storage Reactions

Humboldt State University
   VII.C.3 Dynamic Modeling and Validation of Electrolyzers in Real-Time Grid Simulation

Hydrogen Technology & Energy Corporation
   VII.B.1 Innovative Advanced Hydrogen Mobile Fueler

Hydrogenics
   VII.A.3 Fuel Cell Hybrid Electric Delivery Van Project
   X.3 Maritime Fuel Cell Generator Project
Hy-Performance Materials Testing, LLC

III.3  Low Cost Hydrogen Storage at 875 bar Using Steel Liner and Steel Wire Wrap
IV.D.3  Development, Selection and Testing to Reduce Cost and Weight of Materials for BOP Components

Idaho National Laboratory

VII.C.2  Integrated Systems Modeling of the Interactions between Stationary Hydrogen, Vehicles, and Grid Resources
VII.C.3  Dynamic Modeling and Validation of Electrolyzers in Real-Time Grid Simulation
VII.D.2  High Temperature Electrolysis Test Stand

Institute of Physics, Polish Academy of Sciences

II.F.2  Hybrid Perovskites and Non-Adiabatic Dynamics Simulations: Catching Realistic Aspects of the Charge Recombination Process

International Organization for Standardization

VIII.3  Hydrogen Fuel Quality

Ion Power Inc.

V.B.1  FC-PAD: Fuel Cell Performance and Durability Consortium
V.B.2  FC-PAD: Components and Characterization
V.B.6  High Performance Polymer Electrolyte Membrane Fuel Cell Electrode Structures

ITB Inc.

IV.D.4  Integrated Insulation System for Automotive Cryogenic Storage Tanks

Ivys Energy Solutions

III.14  Advancing Hydrogen Dispenser Technology by Using Innovative Intelligent Networks

Japan Automotive Research Institute

VIII.3  Hydrogen Fuel Quality

Johns Hopkins University

V.A.7  Highly Active, Durable, and Ultra-Low PGM NSTF Thin Film ORR Catalysts and Supports

Lawrence Berkeley National Laboratory

II.D.3  Tandem Particle-Slurry Batch Reactors for Solar Water Splitting
IV.C.3  HyMARC (Core): LBNL Effort
IV.C.6  HyMARC (Support): LBNL Effort
V.A.4  Tailored High-Performance Low-PGM Alloy Cathode Catalysts
V.B.1  FC-PAD: Fuel Cell Performance and Durability Consortium
V.B.2  FC-PAD: Components and Characterization
V.B.3  FC-PAD: Electrode Layers and Optimization
V.B.4  Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
V.C.7  Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells
VI.1  Fuel Cell Membrane Electrode Assembly Manufacturing R&D
VII.C.2  Integrated Systems Modeling of the Interactions between Stationary Hydrogen, Vehicles, and Grid Resources
VII.D.1  H2@Scale Analysis
Lawrence Livermore National Laboratory

II.D.2 Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting
III.10 Liquid Hydrogen Infrastructure Analysis
IV.C.2 HyMARC (Core): LLNL Effort
IV.C.12 Improving the Kinetics and Thermodynamics of Mg(BH₄)₂ for Hydrogen Storage
VII.B.5 Liquid Hydrogen Pump Performance and Durability Testing

LifeGuard Technologies

III.8 Cryogenically Flexible, Low Permeability H₂ Delivery Hose

Linde LLC

VII.B.3 Performance Evaluation of Delivered Hydrogen Fueling Stations
VII.B.5 Liquid Hydrogen Pump Performance and Durability Testing

Liox Power, Inc.

IV.C.7 HyMARC Seedling: Electrolyte Assisted Hydrogen Storage Reactions

Los Alamos National Laboratory

V.A.1 ElectroCat (Electrocatalysis Consortium)
V.A.2 Development of PGM-Free Catalysts for Hydrogen Oxidation Reaction in Alkaline Media
V.A.4 Tailored High-Performance Low-PGM Alloy Cathode Catalysts
V.A.5 Platinum Monolayer Electrocatalysts
V.A.16 Advanced Electro-Catalysts through Crystallographic Enhancement
V.B.1 FC-PAD: Fuel Cell Performance and Durability Consortium
V.B.2 FC-PAD: Components and Characterization
V.B.3 FC-PAD: Electrode Layers and Optimization
V.B.4 Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
V.C.4 Ionomer Dispersion Impact on Fuel Cell and Electrolyzer Performance and Durability (SBIR Phase II TTO)
V.C.6 Advanced Materials for Fully-Integrated MEAs in AEMFCs
V.D.2 Facilitated Direct Liquid Fuel Cells with High Temperature Membrane Electrode Assemblies
V.E.2 Technical Assistance to Developers
VIII.3 Hydrogen Fuel Quality

Mainstream Engineering

VI.1 Fuel Cell Membrane Electrode Assembly Manufacturing R&D
VI.6 In-line Quality Control of PEM Materials

Manta Consulting

VII.B.1 Innovative Advanced Hydrogen Mobile Fueler

Materia, Inc.

IV.D.2 Next Generation Hydrogen Storage Vessels Enabled by Carbon Fiber Infusion with a Low Viscosity, High Toughness Resin System

Michigan Technological University

V.B.4 Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
Montana State University
   IV.D.2 Next Generation Hydrogen Storage Vessels Enabled by Carbon Fiber Infusion with a Low Viscosity, High Toughness Resin System

MVP Co.
   III.3 Low Cost Hydrogen Storage at 875 bar Using Steel Liner and Steel Wire Wrap

N & R Engineering
   III.3 Low Cost Hydrogen Storage at 875 bar Using Steel Liner and Steel Wire Wrap

Nanosonic, Inc.
   III.8 Cryogenically Flexible, Low Permeability H₂ Delivery Hose

NASA
   IV.D.4 Integrated Insulation System for Automotive Cryogenic Storage Tanks

National Fuel Cell Research Center
   VI.2 Clean Energy Supply Chain and Manufacturing Competitiveness Analysis for Hydrogen and Fuel Cell Technologies

National Institute of Standards and Technology
   III.1 Fatigue Performance of High-Strength Pipeline Steels and Their Welds in Hydrogen Gas Service
   IV.C.4 HyMARC (Support): NREL Effort
   V.B.3 FC-PAD: Electrode Layers and Optimization
   V.E.1 Neutron Imaging Study of the Water Transport in Operating Fuel Cells

National Renewable Energy Laboratory
   II.A.1 Analysis of Advanced H₂ Production Pathways
   II.B.1 Renewable Electrolysis Integrated Systems Development and Testing
   II.B.2 High-Performance, Long-Lifetime Catalysts for Proton Exchange Membrane Electrolysis
   II.C.2 Flowing Particle Bed Solarthermal Redox Process to Split Water
   II.D.1 High-Efficiency Tandem Absorbers for Economical Solar Hydrogen Production
   II.D.2 Wide Bandgap Chalcopyrite Photoelectrodes for Direct Solar Water Splitting
   II.E.1 Biomass to Hydrogen (B2H2)
   II.F.4 Mechanistic Investigations on Hydrogen Catalysis by [FeFe]-Hydrogenase
   II.F.5 Bioenergetics of Photosynthetic Energy Transduction: Control of Pathways through Redox Biochemistry
   III.5 Improved Hydrogen Liquefaction through Heisenberg Vortex Separation of para- and ortho-hydrogen
   III.7 700 bar Hydrogen Dispenser Hose Reliability and Improvement
   III.8 Cryogenically Flexible, Low Permeability H₂ Delivery Hose
   III.11 Electrochemical Compression
   III.14 Advancing Hydrogen Dispenser Technology by Using Innovative Intelligent Networks
   III.15 H2FIRST Consolidation
   IV.B.1 Hydrogen Storage System Modeling: Public Access, Maintenance, and Enhancements
   IV.C.4 HyMARC (Support): NREL Effort
   V.A.1 ElectroCat (Electrocatalysis Consortium)
   V.A.6 Extended Surface Electrocatalyst Development
   V.A.8 Highly Accessible Catalysts for Durable High-Power Performance
   V.A.10 Regenerative Fuel Cell System (SBIR Phase II)
V.B.1 FC-PAD: Fuel Cell Performance and Durability Consortium
V.B.2 FC-PAD: Components and Characterization
V.B.3 FC-PAD: Electrode Layers and Optimization
V.B.4 Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
V.C.2 Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications
V.C.5 Highly Stable Anion Exchange Membranes for High-Voltage Redox-Flow Batteries
V.C.7 Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells
V.D.3 Advanced Catalysts and Membrane Electrode Assemblies (MEAs) for Reversible Alkaline Membrane Fuel Cells
V.E.3 Fuel Cell Technology Status: Degradation
V.E.5 Fuel Cell Vehicle Cost Analysis
VI.1 Fuel Cell Membrane Electrode Assembly Manufacturing R&D
VI.2 Clean Energy Supply Chain and Manufacturing Competitiveness Analysis for Hydrogen and Fuel Cell Technologies
VI.6 In-line Quality Control of PEM Materials
VI.7 Manufacturing Competitiveness Analysis for Hydrogen Refueling Stations
VII.A.1 Fuel Cell Electric Vehicle Evaluation
VII.A.2 Technology Validation: Fuel Cell Bus Evaluations
VII.B.2 Hydrogen Station Data Collection and Analysis
VII.B.4 Hydrogen Component Validation
VII.B.6 Hydrogen Meter Benchmark Testing
VII.C.1 Optimal Stationary Fuel Cell Integration and Control (Energy Dispatch Controller)
VII.C.2 Integrated Systems Modeling of the Interactions between Stationary Hydrogen, Vehicles, and Grid Resources
VII.C.3 Dynamic Modeling and Validation of Electrolyzers in Real-Time Grid Simulation
VII.D.1 H2@Scale Analysis
VIII.1 National Codes and Standards Development and Outreach
VIII.7 NREL Hydrogen Sensor Testing Laboratory
IX.5 Sustainability Analysis: Hydrogen Regional Sustainability (HyReS)
IX.6 Hydrogen Financial Analysis Scenario Tool (H2FAST) Updates with Analysis of 101st Station
IX.7 Regional Supply of Hydrogen
IX.11 Resource Availability for Hydrogen Production

**Newcomb Anderson McCormick**

VIII.11 Advancing Fuel Cell Electric Vehicles in San Francisco and Beyond

**Nissan Technical Center North America**

V.A.9 Corrosion-Resistant Non-Carbon Electrocatalyst Supports for PEFCs
V.B.7 Fuel Cell Membrane Electrode Assemblies with Ultra-Low Pt Nanofiber Electrodes
V.C.2 Advanced Hybrid Membranes for Next Generation PEMFC Automotive Applications

**Northeastern University**

II.B.3 High Performance Platinum Group Metal Free Membrane Electrode Assemblies through Control of Interfacial Processes
V.A.3 Innovative Non-PGM Catalysts for High-Temperature PEMFCs
V.A.17 Vapor Deposition Process for Engineering of Dispersed PEMFC ORR Pt/NbO\textsubscript{x}/C Catalysts
Norwegian University Science and Technology
V.B.3 FC-PAD: Electrode Layers and Optimization

NOV Fiberglass Systems
VI.5 Continuous Fiber Composite Electrofusion Coupler

Nuvera Fuel Cells
X.4 Demonstration of Fuel Cell Auxiliary Power Unit (APU) to Power Truck Refrigeration Units (TRUs) in Refrigerated Trucks

Oak Ridge National Laboratory
III.1 Fatigue Performance of High-Strength Pipeline Steels and Their Welds in Hydrogen Gas Service
III.3 Low Cost Hydrogen Storage at 875 bar Using Steel Liner and Steel Wire Wrap
III.4 Advanced Barrier Coatings for Harsh Environments
III.13 Metal Hydride Compression
V.A.1 ElectroCat (Electrocatalysis Consortium)
V.A.4 Tailored High-Performance Low-PGM Alloy Cathode Catalysts
V.A.7 Highly Active, Durable, and Ultra-Low PGM NSTF Thin Film ORR Catalysts and Supports
V.B.1 FC-PAD: Fuel Cell Performance and Durability Consortium
V.B.2 FC-PAD: Components and Characterization
V.B.3 FC-PAD: Electrode Layers and Optimization
V.B.4 Novel Ionomers and Electrode Structures for Improved PEMFC Electrode Performance at Low PGM Loadings
V.C.4 Ionomer Dispersion Impact on Fuel Cell and Electrolyzer Performance and Durability (SBIR Phase II TTO)
V.C.7 Advanced Ionomers and MEAs for Alkaline Membrane Fuel Cells
VIII.9 Compatibility of Polymeric Materials Used in the Hydrogen Infrastructure

Ohio Fuel Cell Coalition
VI.2 Clean Energy Supply Chain and Manufacturing Competitiveness Analysis for Hydrogen and Fuel Cell Technologies

Oregon State University
II.E.3 Novel Hybrid Microbial Electrochemical System for Efficient Hydrogen Generation from Biomass

Pacific Northwest National Laboratory
III.6 Magnetocaloric Hydrogen Liquefaction
IV.A.2 Hydrogen Storage Cost Analysis
IV.B.1 Hydrogen Storage System Modeling: Public Access, Maintenance, and Enhancements
IV.C.5 HyMARC (Support): PNNL Effort
VII.D.1 H2@Scale Analysis
VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources
VIII.9 Compatibility of Polymeric Materials Used in the Hydrogen Infrastructure
X.4 Demonstration of Fuel Cell Auxiliary Power Unit (APU) to Power Truck Refrigeration Units (TRUs) in Refrigerated Trucks

Pajarito Powder, LLC
II.B.6 Economical Production of Hydrogen through Development of Novel, High Efficiency Electrocatalysts for Alkaline Membrane Electrolysis
V.A.2 Development of PGM-Free Catalysts for Hydrogen Oxidation Reaction in Alkaline Media
Pajarito Powder, LLC (Continued)
  V.A.3 Innovative Non-PGM Catalysts for High-Temperature PEMFCs
  V.A.13 Development of Durable Active Supports for Low Platinum Group Metal Catalysts (SBIR I)

Palo Alto Research Center
  II.B.8 Multi-Scale Ordered Cell Structure for Cost Effective Production of Hydrogen by HTWS

PDC Machines
  III.15 H2FIRST Consolidation

pH Matter LLC
  V.A.10 Regenerative Fuel Cell System (SBIR Phase II)
  V.A.14 Multi-Functional Catalyst Support (SBIR I)

Plug Power
  X.2 Ground Support Equipment Demonstration
  X.5 FedEx Express Hydrogen Fuel Cell Extended-Range Battery Electric Vehicles

Proton OnSite
  II.B.3 High Performance Platinum Group Metal Free Membrane Electrode Assemblies through Control of Interfacial Processes
  II.B.6 Economical Production of Hydrogen through Development of Novel, High Efficiency Electrocatalysts for Alkaline Membrane Electrolysis
  II.B.7 New Approaches to Improved PEM Electrolyzer Ion Exchange Membranes
  VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

Purdue University
  V.A.7 Highly Active, Durable, and Ultra-Low PGM NSTF Thin Film ORR Catalysts and Supports

Quong & Associates, Inc.
  VII.B.1 Innovative Advanced Hydrogen Mobile Fueler

RCF Economic and Financial Consulting, Inc.
  IX.1 Employment Impacts of Hydrogen and Fuel Cell Technologies

Rensselaer Polytechnic Institute
  III.11 Electrochemical Compression
  V.C.6 Advanced Materials for Fully-Integrated MEAs in AEMFCs

Rheonik GmBH
  III.14 Advancing Hydrogen Dispenser Technology by Using Innovative Intelligent Networks

SAE International
  VIII.3 Hydrogen Fuel Quality

Saint Louis University
  IV.C.10 HyMARC Seedling: Fundamental Studies of Surface-Functionalized Mesoporous Carbons for Thermodynamic Stabilization and Reversibility of Metal Hydrides
Sandia National Laboratories

II.C.1 High Efficiency Solar Thermochemical Reactor for Hydrogen Production
III.1 Fatigue Performance of High-Strength Pipeline Steels and Their Welds in Hydrogen Gas Service
III.13 Metal Hydride Compression
III.16 Reference Station Design, Phase II
IV.C.1 HyMARC (Core): SNL Effort
IV.C.12 Improving the Kinetics and Thermodynamics of Mg(BH$_4$)$_2$ for Hydrogen Storage
IV.D.3 Development, Selection and Testing to Reduce Cost and Weight of Materials for BOP Components
V.C.6 Advanced Materials for Fully-Integrated MEAs in AEMFCs
VIII.2 R&D for Safety, Codes and Standards: Materials and Components Compatibility
VIII.4 R&D for Safety, Codes and Standards: Hydrogen Behavior
VIII.5 Hydrogen Quantitative Risk Assessment
VIII.9 Compatibility of Polymeric Materials Used in the Hydrogen Infrastructure
VIII.10 Enabling Hydrogen Infrastructure Through Science-Based Codes and Standards
IX.4 Hydrogen Analysis with the Sandia ParaChoice Model
X.3 Maritime Fuel Cell Generator Project

Santa Monica Fire Department

VIII.6 Hydrogen Safety Panel, Safety Knowledge Tools and First Responder Training Resources

Savannah River Consulting

IV.B.2 Investigation of Solid State Hydrides for Autonomous Fuel Cell Vehicles
IV.C.16 Electrochemical Reversible Formation of Alane

Savannah River National Laboratory

III.12 Hybrid Electrochemical Hydrogen/Metal Hydride Compressor
IV.B.1 Hydrogen Storage System Modeling: Public Access, Maintenance, and Enhancements
IV.B.2 Investigation of Solid State Hydrides for Autonomous Fuel Cell Vehicles
IV.C.16 Electrochemical Reversible Formation of Alane
IV.D.4 Integrated Insulation System for Automotive Cryogenic Storage Tanks
V.A.11 Development of Corrosion Resistant Carbon (CRC) Support for Ultra-Low Platinum Group Metal (PGM) Catalysts (SBIR Phase I)
VI.5 Continuous Fiber Composite Electrofusion Coupler

Smart Chemistry

VII.B.4 Hydrogen Component Validation
VIII.3 Hydrogen Fuel Quality

Southern Illinois University

IV.C.9 HyMARC Seedling: “Graphene-Wrapped” Complex Hydrides as High-Capacity, Regenerable Hydrogen Storage Materials

Southwest Research Institute®

III.2 Hydrogen Compression Application of the Linear Motor Reciprocating Compressor (LMRC)

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