

IX Acronyms and Abbreviations

| | | | |
|--------------------------------|--|-------------------|--|
| °C | Degrees Celsius | a-Si | Amorphous silicon |
| °F | Degrees Fahrenheit | ASIC | Application-specific integrated circuit |
| 2-D | Two-dimensional | a-SiGe | Amorphous silicon germanium |
| 3-D | Three-dimensional | ASME | American Society of Mechanical Engineers |
| 1Q | First quarter of the fiscal year | ASR | Area-specific resistance |
| 2Q | Second quarter of the fiscal year | ASTM | American Society for Testing and Materials |
| 3Q | Third quarter of the fiscal year | atm | atmosphere |
| 4Q | Fourth quarter of the fiscal year | ATMI | Advanced Technical Materials Incorporated |
| 6F | Hexafluorinated (biphenol A) sulfonated poly(arylene ether sulfone) | ATP | Adenosine triphosphate |
| 6F-CN-35 | Hexafluorinated / nitrile-functional sulfonated poly(arylene ether sulfone) (35 is the degree of sulfonation, %) | ATR | Autothermal reformer |
| $\Omega\text{-cm}^2$ | Ohm-square centimeter | Au | Gold |
| A | Ampere, amp | AuS | Gold sulfide |
| Å | Angstrom | AXS | Advanced X-ray Solutions |
| A/cm ² | Amps per square centimeter | B | Boron |
| A/D | Analog to digital | Ba | Barium |
| AC | Alternating current | barg | Bar gauge |
| ACR | Autothermal cyclic reforming | BAT | Brown adipose tissue |
| ACS | American Chemical Society | BET | Bruner, Emmett and Teller surface area analysis method |
| AEM | Analytical electron microscopy | BNL | Brookhaven National Laboratory |
| AER | Absorption-enhanced reforming | BOP | Balance of plant |
| AFCIA | Advanced Fuel Cells Implementing Agreement | BP | British Petroleum |
| AFM | Atomic force microscopy | BPSH | Biphenyl sulfone |
| Ag | Silver | BSE | Backscatter electron |
| AGB | Anode gas burner | BU | Boston University |
| AgCl | Silver chloride | C | Carbon |
| AgS | Silver sulfide | C&C | City and County of Honolulu |
| AIChE | American Institute of Chemical Engineers | CaCO ₃ | Calcium carbonate |
| AIP | Analytical Interatomic Potential (computer model) | CAE | Computer-aided engineering |
| AirCred | Air Quality Credits tool | CaFCP | California Fuel Cell Partnership |
| Al | Aluminum | CANMET | Canada Center for Mineral and Energy Technology |
| Al ₂ O ₃ | Aluminum oxide | CaO | Calcium oxide |
| ANL | Argonne National Laboratory | CAPEX | Capital expense |
| ANSI | American National Standards Institute | CATA | Centre Area Transit Authority |
| Ap | Pool contact area | CAU | Clark Atlanta University |
| APU | Auxiliary power unit | cc | Cubic centimeter |
| Ar | Argon | cc/g cat/hr | Cubic centimeters per gram catalyst per hour |
| As | Arsenic | CCD | Charge coupled device |
| ASF | Amps per square foot | CCH | Complex compound hydride |
| | | CCHSS | Complex compound hydrogen storage system |

| | | | |
|---------------------|---|-------------------|---|
| CCM | Catalyst-coated membrane | CSFTP | Cold-Start Federal Test Procedure |
| ccm | Cubic centimeters per minute | CSMP | Cabot Superior MicroPowders |
| Ce | Cerium | CSTT | Codes and Standards Tech Team |
| CE | European Commonwealth certification mark | CTO | Conductive transparent oxide |
| CEC | California Energy Commission | CTQ | Critical to quality |
| CeCl ₃ | Cerium trichloride | Cu | Copper |
| CEM | Compressor/Expander/Motor | cu.yd. | Cubic yard |
| CEM | Continuous emissions monitoring | Cu ₂ O | Cuprous oxide |
| CeO ₂ | Ceric oxide | Cu ₂ S | Copper Sulfide |
| Cermet | Combination of ceramic and metal | CUTE | Clean Urban Transport for Europe |
| CESI | Catalytica Energy Systems, Inc. | CV | Cyclic voltammetry, cyclic voltammogram |
| CFD | Computational Fluid Dynamics | CVD | Chemical vapor deposition |
| CGA | Compressed Gas Association | CWRU | Case Western Reserve University |
| CGO | Cerium gadolinium oxide | DBEDT | Hawaii Department of Business, Economic Development and Tourism |
| CH ₂ | Compressed hydrogen gas | | |
| CH ₃ CHO | Acetaldehyde | | |
| CH ₄ | Methane | DC | Direct current |
| Chl | Chlorophyll | DCEC | Delaware County Electric Cooperative, Inc. |
| CHP | Combined heat and power | DE | Distributed electrolysis |
| CIGS | Copper-indium-gallium-diselenide | DFMA | Design for Manufacturing and Assembly |
| CIS | CuInSe | DFT | Density Functional Theory |
| CL | Catalytic layer | DGE | Diesel gallon equivalent |
| Cl | Chlorine | DHW | Domestic hot water |
| CLV | City of Las Vegas | DI | Deionized |
| cm | Centimeter | dL/g | Deciliters per gram |
| cm ² | Square centimeter | DMA | Dynamic mechanical analysis |
| CME | Coefficient of Moisture Expansion (i.e. water swelling) | DMAc | Dimethyl acetamide |
| CMOS | Complementary metal oxide semiconductor | DMC | Dimethylcarbonate |
| CMSA | Consolidated metropolitan statistical area | DMFC | Direct methanol fuel cell |
| CNC | Computer numerical control | DMSO | Dimethyl sulfoxide |
| CNG | Compressed natural gas | DNA | Deoxyribonucleic acid |
| CO | Carbon monoxide | DOE | U.S. Department of Energy |
| Co | Cobalt | DOE EIA | Department of Energy, Energy Information Agency |
| CO ₂ | Carbon dioxide | DOS | Density of states |
| COS | Carbon oxysulfide | DP | Dew point |
| CO _x | Oxides of carbon | DRIFTS | Diffuse reflectance infrared Fourier transform spectroscopy |
| cpi | Cells per inch | | |
| CPO _x | Catalytic partial oxidation | DSU | Delaware State University |
| cps | Cells per square inch | e ⁻ | Electron |
| CPSS | Combinatorial powder synthesis system | E | Potential |
| Cr | Chromium | E _{1/2} | Half-wave potential |
| CS | Constant stoichiometry | Ea | Activation energy |
| CS&D | Compression, storage and dispensing | EC | Electrochemical |
| CSA | Cell stack assembly | EC | European Community |
| | | ECS | Electrochemical Society |
| | | ECSA | Electrochemical surface area |

| | | | |
|--------------------------------|---|-----------------|--|
| EDAX | Energy dispersive X-ray | fwGS | Forward water-gas shift |
| EDC | Valence electron energy distribution curve | FY | Fiscal year |
| EDS | Energy dispersive x-ray spectroscopy | g | Gram |
| EERE | Office of Energy Efficiency and Renewable Energy | g/cc | Grams per cubic centimeter |
| EESM | Electrical energy storage module | g/min | Grams per minute |
| ELAT [®] | Registered Trademark of De Nora North America, Inc., covers GDLs and GDEs | g/s | Grams per second |
| Ep | Peak potential | Ga | Gallium |
| EPA | U.S. Environmental Protection Agency | GaAs | Gallium arsenic |
| EPMA | Electron probe microanalyzer | GADDS | General area diffraction system |
| EPR | Electron paramagnetic resonance | gal | Gallon |
| ESR | Electron spin resonance | GC | Gas chromatograph |
| ESS | Energy storage system | GC | GenCore |
| EtOH | Ethanol | GC | Glassy, or vitreous carbon; a pure carbon that is amorphous (non-crystalline) |
| ETS-10 | Engelhard titanium silicate - 10 | GC/MS | Gas chromatograph/Mass spectroscopy |
| eV | Electron volt | GC5T | GenCore 5T platform prototype back-up fuel cell design for telecommunications |
| ExCo | Executive Committee (of HIA) | GCII | GenCore Gen II back-up fuel cell design |
| F | Fluorine | GCtool | Software package developed at ANL for analysis of fuel cells and other power systems |
| F ⁻ | Fluorine ion | GDE | Gas diffusion electrode |
| FASTER | Feasibility of Acceptable Start Time Experimental Reactor | GDL | Gas diffusion layer |
| FC | Fuel cell | GDS | Galvanodynamic scan |
| FCCP | Carbonyl cyanide m-chlorophenylhydrazone | GE | General Electric |
| FCPP | Fuel cell power plant | GEPC | Galactic Electric Power Cooperative, Inc. |
| FCS | Fuel cell system | GES | Giner Electrochemical Systems, LLC |
| FCV | Fuel cell vehicle | GH ₂ | Gaseous hydrogen |
| Fe | Iron | GHG | Greenhouse gas |
| Fe ₂ O ₃ | Ferric oxide | GHSV | Gas hourly space velocity |
| FEA | Finite element analysis | GIS | Geographic information system |
| FER | Fluoride emission rate | GJ | Gigajoule |
| fg-ELAT | Fine gradient ELAT | gm | Gram |
| FHDS | Federal Highway Driving Schedule | gm/day | Grams per day |
| FIRST | Fuel cell Innovative Remote Systems for Telecommunications (Spain) | GPPE | Working Party on Pollution and Energy |
| FMEA | Failure modes and effects analysis | GREET | Greenhouse Gas Energy and Emissions in Transportation model |
| FP | Fuel processor | GSS | Galvanostatic scan |
| FPS | Fuel processing system | GTI | Gas Technology Institute |
| FRS | Functional requirement specifications | GW | Gigawatt |
| ft ² | Square feet | GWe | Gigawatt electric |
| FTA | Federal Transit Administration | h | Hour |
| FUDS | Federal Urban Driving Schedule | | |

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|---------------------------------|--|---------|---|
| H | Hydrogen | HT | High-throughput |
| H ₃ PO ₄ | Ortho-phosphoric acid | HTFC | High-temperature fuel cell |
| H ⁺ | Proton | HTM | High-temperature membrane |
| H ₂ | Diatomic hydrogen | HTS | High-temperature shift |
| H ₂ ICE | Hydrogen-fueled internal combustion engine | HTSC | High-temperature shift converter |
| H ₂ A | Hydrogen Analysis | HTXRD | High-temperature X-Ray diffraction |
| H ₂ O | Water | Hythane | Compressed hydrogen natural gas blend |
| H ₂ O:C | Steam to carbon ratio | Hz | Hertz |
| H ₂ O ₂ | Hydrogen peroxide | I | Current |
| H ₂ PO ₄ | Dihydrogen phosphate anion | IBAD | Ion beam assisted deposition |
| H ₂ S | Hydrogen sulfide | ICC | International Code Council |
| H ₂ SO ₄ | Sulfuric acid | ICE | Internal combustion engine |
| H ₃ PO ₄ | Phosphoric acid | ICEV | Internal combustion engine vehicle |
| Hammer | Hazardous Materials Management and Emergency | ICP | Inductively coupled plasma |
| HAZOP | Hazards and Operational Safety Analysis | ICP-MS | Inductively coupled plasma mass spectrometry |
| HC | Hydrocarbon | ICR | Interfacial contact resistance |
| HCl | Hydrochloric acid | IEA | International Energy Agency |
| HClO ₄ | Perchloric acid | IEC | International Electrotechnical Commission |
| HCNG | Hydrogen-compressed natural gas | IEC | Ion exchange capacity |
| HDMR | Hydrogen-driven metallurgical reactions | IEEE | Institute of Electrical and Electronics Engineers, Inc. |
| HE | Heat exchanger | IIT | Illinois Institute of Technology |
| He | Helium | In | Indium |
| HEM | Hydroxyl ion exchange membrane | INEEL | Idaho National Engineering and Environmental Laboratory |
| HER | Hydrogen evolution reaction | InP | Indium phosphorus |
| HEV | Hybrid electric vehicle | IPCE | Incident photon conversion to electrons |
| Hf | Hafnium | IPHE | International Partnership for Hydrogen Energy |
| HF | Hydrofluorhydric acid | IR | Infrared |
| HFCIT | Hydrogen, Fuel Cells and Infrastructure Technologies Program | Ir | Iridium |
| HFCTF | Hawaii Fuel Cell Test Facility | IR | Voltage loss due to resistance |
| HFI | Hydrogen Fuel Initiative | ISE | International Society of Electrochemistry |
| HFR | High-frequency impedance | ISO | International Organization for Standardization |
| Hg | Mercury | ITM | Ion transport membrane |
| Hg ₂ SO ₄ | Mercurous sulfate | ITO | Indium tin oxide |
| HHV | Higher heating value | ITR | Integrated test rig |
| HIA | Hydrogen Implementing Agreement | I-V | Current-voltage |
| HNEI | Hawaii Natural Energy Institute | IV | Inherent viscosity |
| Hp | Average pool height | J | Joule |
| hp | Horsepower | K | Kelvin |
| HPE | Hybrid photoelectrode | K | Potassium |
| hr | Hour | kÅ | 1000 angstroms |
| HRTEM | High-resolution transmission electron microscope | kbar | 1000 bar |
| HSAC | High surface area carbon | | |
| HSO ₄ | Bisulfate anion | | |
| HT | High-temperature | | |

| | | | |
|-----------------|--|---------------------|--|
| KBr | Potassium bromide | LTS | Low-temperature shift |
| kBTU | 1000 British thermal units | m | Meter |
| kcal | Kilocalorie | M | Molar |
| kcal/mol | Kilocalories per mole | m/s | Meters per second |
| kDa | Kilo-Daltons | m ² /g | Square meters per gram |
| KeV | Kilo electron volts | m ² /s | Square meters per second |
| kg | Kilogram | M31 | Atofina membrane candidate |
| kg/day | Kilograms per day | mA | MilliAmps |
| kg/hr | Kilograms per hour | mA/cm ² | Milliamps per square centimeter |
| KHR | 1000 hours | MBL | Modified boundary layer |
| KIC | Key industrial collaborators | MCFC | Molten carbonate fuel cell |
| kJ | Kilojoule | mCoul | Millicoulomb |
| kJ/mol | Kilojoules per mole | MEA | Membrane electrode assemble |
| KOH | Potassium hydroxide | MEEEC | Mohegan Energy, Environmental, Economics Education Center |
| kPa | Kilopascal | | |
| kW | Kilowatt | MEMS | Micro Electromechanical System |
| kWe | Kilowatt electric | MEMSYS | Micro-grid Energy Management System |
| kWh | Kilowatt-hour | | |
| kWh/kg | Kilowatt-hours per kilogram | MeOH | Methanol |
| kWh/L | Kilowatt-hours per liter | MEOP | Maximum Expected Operating Pressure |
| kWt | Kilowatt thermal | | |
| L | Liter | meq | Milliequivalents |
| L/h | Liters per hour | meq/gram | Milliequivalents/gram |
| L/min | Liters per minute | Mg | Magnesium |
| La | Lanthanum | mg | Microgram |
| LANL | Los Alamos National Laboratory | mg | Milligram |
| LAX | Los Angeles International Airport | Mg(OH) ₂ | Magnesium hydroxide |
| lb | Pound | mg/cm ² | Milligrams per square centimeter |
| LBNL | Lawrence Berkeley National Laboratory | MgCl ₂ | Magnesium chloride |
| LCC | Lansing Community College | MgH ₂ | Magnesium hydride |
| LCHPP | Low Cost Hydrogen Production Platform (DOE Program Title) | MgO | Magnesium oxide |
| LDV | Light-duty vehicle | MHCoE | Metal Hydride Center of Excellence |
| LED | Light-emitting diode | min | Minute |
| LEEM | Low-energy electron microscopy | MJ | Megajoules |
| LEIS | Low-energy ion scattering | mL | Milliliter |
| LEMSYS | Local energy management system | ml/h | Milliliters per hour |
| LH ₂ | Cryogenic liquid hydrogen | µm | Micrometer, micron |
| LHV | Lower heating value | µM | Micromolar |
| Li | Lithium | mm | Millimeter |
| LiH | Lithium hydride | MM | Molecular modeling |
| LLC | Limited Liability Company | MMBtu | Millions of British thermal units |
| LLNL | Lawrence Livermore National Laboratory | µmol | Micromole |
| low-dP | Low pressure drop | MMOM | Microporous metal oxide matrix |
| Lpm | Liters per minute | Mn | Manganese |
| LSGM | Lanthanum strontium gallium magnesium oxide | MO | Fetal Organic Framework |
| LT | Low-temperature | Mo | Molybdenum |
| | | mol | Mole |
| | | mol% | Mole percent |
| | | mol/min | Moles per minute |

| | | | |
|----------------------------------|---|-----------------|--|
| mole/(m ² Pa•s) | Mole per meter squared Pascal second (flux unit) | NASA PERS | National Aeronautics and Space Agency Polymer Energy Rechargeable System |
| MoO ₃ | Molybdenum trioxide (molydite) | | |
| MoPc | Molybdenum phthalocyanine | NAVSEA | Carderock Naval Sea Systems Command Carderock Division |
| MPa | Megapascal | | |
| mpgge | Miles per gallon gasoline equivalent | Nb | Niobium |
| mph | Miles per hour | NCMS | National Center for Manufacturing Sciences |
| MRI | Magnetic resonance imaging | | |
| MRS | Materials Research Society | NCNR | NIST Center for Neutron Research |
| ms | Milliseconds | ND | Not determined at this time |
| mS/cm | Milli-Siemens per centimeter | Nd:YAG | Neodymium-doped yttrium aluminum garnet |
| MSCFD | Thousand standard cubic feet per day gas flowrate | NDIR | Non-dispersive infrared |
| MSHA | Mine Safety and Health Administration | NEBS | Network Equipment-Building System |
| MSU | Montana State University | NEDC | New European Driving Cycle |
| MT | Medium-throughput | NEMS | National Energy Modeling System |
| MTI | McDermott Technology, Inc. | NEPA | National Environmental Policy Act |
| mV | Micro volt | NETL | National Energy Technology Laboratory |
| mV | Millivolt | | |
| MW | Megawatt | NEU | Northeastern University |
| MW | Molecular weight | NFC | Near frictionless carbon |
| mΩ | Milli-ohms | NFPA | National Fire Protection Association |
| MWe | Megawatts electric | NG | Natural gas |
| MWh | Megawatt-hour | NH ₃ | Ammonia |
| MWNT | Multi-wall nanotube | NHA | National Hydrogen Association |
| MWth | Megawatts thermal | NHE | Normal hydrogen electrode |
| MYPP | Multi-Year Program Plan (the HFCIT Program's Multi-Year Research, Development and Demonstration Plan) | Ni | Nickel |
| | | NICC | Natural gas Infrastructure Component Cost model |
| MYRDDP | Multi-Year Research, Development and Demonstration Plan | NiMH | Nickel metal hydride |
| | | NIST | National Institute of Standards and Technology |
| N | Nitrogen | nm | Nanometer |
| N/cm ² | Newtons per square centimeter | NMHC | Non-methane hydrocarbons |
| N112 | Nafion 1100 equivalent weight, 2 millimeter thick membrane | NMOG | Non-methane organic gases |
| N ₂ | Diatomic nitrogen | nmol | Nanomole |
| Na | Sodium | NMP | N-methyl pyrrolidone |
| Na ₃ AlH ₆ | Trisodium hexahydroaluminate | NMR | Nuclear magnetic resonance |
| NaAlH ₄ | Sodium aluminum hydride (sodium tetrahydroaluminate) | NO ₂ | Nitric oxide |
| NaBH ₄ | Sodium borohydride | NO _x | Oxides of nitrogen |
| NaCl | Sodium chloride | NPM | Non-precious metal |
| NAFION [®] | Registered Trademark of E.I. DuPont de Nemours | NPV | Net present value |
| NaH | Sodium hydride | NRECA | National Rural Electric Cooperative Association |
| NaOH | Sodium hydroxide | NREL | National Renewable Energy Laboratory |
| NASA | National Aeronautics and Space Administration | NSSN | National Resource for Global Standards |
| | | NSTF | Nanostructured thin film |

| | | | |
|-------------------|---|--------------------|--|
| O | Oxygen | PI | Platinum |
| O&M | Operation and maintenance | PM | Particulate matter |
| O ₂ | Diatomic oxygen | PM | Particulate membrane |
| O ₂ :C | Oxygen to carbon ratio | PM | Precious metal, such as platinum |
| OCV | Open circuit voltage | PNNL | Pacific Northwest National Laboratory |
| OEM | Original equipment manufacturer | | |
| OG | Off-gas | POC | Proof of concept |
| OH ⁻ | Hydroxyl radical | POX | Partial oxidation |
| OMB | Office of Management and Budget | PP1R | Power Plant One Reformate |
| OPEX | Operating expense | ppb | Parts per billion |
| OPM | Oxford Performance Materials, Inc. | ppbv | Parts per billion by volume |
| ORNL | Oak Ridge National Laboratory | ppm | Parts per million |
| ORR | Oxygen reduction reaction | ppmv | Parts per million by volume |
| OTM | Oxygen transport membrane | ppmw | Parts per million by weight |
| OTT | Office of Transportation Technologies | ppt | Parts per trillion |
| OU | Ohio University | Pr | Praseodymium |
| P | Phosphorus | PrOx | Preferential oxidation |
| P | Pressure | PS | Photosystem |
| P&ID | Process and Instrumentation Diagram | PS | Potentiostatic |
| Pa | Pascal | PSA | Pressure swing adsorption |
| PADD | Petroleum Administration for Defense Districts | PSAT | Puget Sound Action Team |
| PAFC | Phosphoric acid fuel cell | PSAT | Vehicle simulation software package developed at Argonne National Laboratory |
| PBI | Polybenzimidazole | psi | Pounds per square inch |
| PCS | Power conditioning system | psia | Pounds per square inch absolute |
| PCT | Pressure concentration temperature | psid | Pounds per square inch differential |
| Pd | Palladium | psig | Pounds per square inch gauge |
| PDC | Polymer-derived ceramic | PSII | Photosystem II |
| Pd-MIS | Palladium-based metal-insulator- semiconductor | PSU | Pennsylvania State University |
| PDU | Process development unit | PSU OPP | Penn State University, Office of Physical Plant |
| PEC | Photoelectrochemical | PSU PTI | Penn State University, Pennsylvania Transportation Institute |
| PECH | Polyepichlorohydrin | Pt | Platinum |
| PEEK | Polyetherketones | P-T | Pressure-temperature |
| PEFC | Polymer electrolyte fuel cell | Pt ₃ Co | Platinum-cobalt alloy |
| PEFC | Proton exchange fuel cell | Pt ₃ Ni | Platinum-nickel alloy |
| PEI | Polyether imide | PTFE | Teflon – poly-tetrafluoroethylene |
| PEKK | Poly (ether ketone ketone) | Pt-FePO | Platinum iron phosphate |
| PEM | Polymer electrolyte membrane, proton exchange membrane | PTM | Proton transport membrane |
| PEMFC | Polymer electrolyte membrane fuel cell | PtML | Platinum monolayer |
| PEN | Positive-Electrolyte-Negative | Pt-SnO | |
| PES | Polyethersulfone | Pt-TaPO | Platinum tantalum phosphate |
| PES | Power Engineering Society | PURE | Promoting Unst Renewable Energy (UK) |
| PFD | Process flow diagram | PV | Photovoltaic |
| PFSA | Perfluorinated sulfonic acid | PVDF | Polyvinylidene fluoride |
| PGM | Platinum group metal | P-V-T | Pressure-Volume-Temperature |
| | | Q1, Q2, Q3, Q4 | Quarters of the fiscal year |

| | | | |
|------------------|--|-------------------|---|
| QFD | Quality Function Deployment | Sm | Samarium |
| R&D | Research and development | SMR | Steam methane reformer |
| RBS | Rutherford backscattering | Sn | Tin |
| RD&D | Research, development & demonstration | SnCl ₂ | Stannous chloride |
| RDE | Rotating disk electrode | SNG | Synthetic natural gas |
| Re | Rhenium | SNL | Sandia National Laboratory |
| RFC | Regenerative fuel cell | SO ₂ | Sulfur dioxide |
| RFP | Request for proposals | SOFC | Solid oxide fuel cell |
| RH | Relative humidity | SOM | Solid-oxide oxygen-ion-conducting membrane |
| Rh | Rhodium | SO _x | Oxides of sulfur |
| RHE | Reference hydrogen electrode | SPC | Statistical process control |
| rpm | Revolutions per minute | SPEKK | Sulfonated polyether ether ketone |
| RRDE | Rotating ring disc electrode | sq.ft. | Square foot |
| RTD | Resistance thermal device | SR | Steam reformer |
| RTI | Research Triangle Institute | Sr | Strontium |
| Ru | Ruthenium | SRI | Stanford Research Institute |
| s | Second | | International |
| S | Siemens | SS | Stainless steel |
| S | Sulfur | STAR | Substrate-based Transportation Autothermal Reformer |
| S/C | Steam-to-carbon ratio | | |
| S/cm | Siemens per centimeter | STCH | Solar thermochemical hydrogen |
| S300 | Series 300 fuel processing and PEM cell system | STEM | Scanning transmission electron microscope |
| SA | Specific activity | STH | Solar-to-hydrogen |
| SAD | Surface-averaged distribution | STM | Scanning tunneling microscope |
| SAE | Society of Automotive Engineers | STTP | Shared Technology Transfer Project |
| Sc | Scandium | SUNY | State University of New York |
| sccm | Standard cubic centimeters per minute | SWNT | Single-walled nanotube |
| SCE | Saturated calomel electrode | SwRI | Southwest Research Institute |
| SCF, scf | Standard cubic feet | T | Temperature |
| scfd | Standard cubic feet per day | t | Time |
| SCFH, scfh | Standard cubic feet per hour | t/d | tonnes per day |
| ScSZ | Scandia stabilized zirconia | Ta | Tantalum |
| SD | Standard deviation | TAFV | Transition Alternative Fuels and Vehicles |
| SDA | Structure directing agent | TAG | Technical Advisory Group |
| SDO | Standards Development Organization | TC | Thermocouple |
| Se | Selenium | TCGC | Thermal conductivity gas chromatograph |
| sec | Second | TDARMS | Thermal desorption and recoiling mass spectrometry |
| SEM | Scanning electron microscope | TEM | Transmission electron microscopy |
| SEMaC | Smart Energy Management Controller | TESI | Teledyne Energy System Inc. |
| SEP | Subscale engineering prototype | Tg | Glass transition temperature |
| SF ₆ | Sulfur hexafluoride | TGA | Thermal gravimetric analysis |
| SHE | Standard hydrogen electrode | THC | Total hydrocarbons |
| Si | Silicon | Ti | Titanium |
| SiO ₂ | Silicon dioxide | TiCl ₃ | Titanium trichloride |
| SLPM | Standard liters per minute | TiH ₂ | Titanium hydride |

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|------------------|--|------------------|--|
| TIM | Traction inverter motor | V | Vanadium |
| TiO ₂ | Titanium dioxide | V | Volt |
| TIVM | Toroidal intersecting vane machine | VASP | Vienna Ab-initio Simulation |
| Tla | Truncated light-harvesting chlorophyll antenna | VC | Vulcan carbon |
| tla1 | Mutant of the Tla1 gene | VHTS | Virtual high-throughput screening |
| tlaX | Mutant of unknown gene with a truncated light-harvesting chlorophyll antenna | VNT | Variable nozzle turbine |
| | | VOC | Volatile organic compound |
| | | vol | Volume |
| TM | Transition metal | vol% | Volume percent |
| TMS | Thermal management system | VR | Voltage – current – resistance curve |
| TPD | Temperature-programmed desorption | W | Tungsten |
| | | W | Watt |
| TPR | Temperature-programmed reduction | W/L | Watts per liter |
| TTW | Through the wafer | W/m-K | Watts per meter-Kelvin |
| TWh | TeraWatt-hour | WDS | Wavelength dispersive spectroscopy |
| TWM | Thermal and water management | We | Watt electric |
| Type IV | Plastic lined tanks completely overwrapped with composite | WGS | Water gas shift |
| UC | University of California | W-h/kg | Watt-hours per kilogram |
| UCP | Uncoupling protein | W-h/L | Watt-hours per liter |
| UGA | University of Georgia, Athens | WHSV | Weight hourly space velocity |
| UH | University of Hawaii | WO ₃ | Tungsten trioxide |
| UHV | Ultra-high vacuum | Wt | Watts thermal |
| UL | Underwriters Laboratory | WT | Wild-type (unmutated) |
| UNIGEN® | A registered trademark of Proton Energy Systems, Inc. | wt% | Weight percent (percent by weight) |
| | | XANES | X-ray absorption near-edge spectroscopy |
| UPD | Underpotential deposition | XAS | X-ray absorption spectroscopy |
| UPS | Uninterruptible power supply | Xe | Xenon |
| US06 | Driving cycle to simulate high-speed vehicle operation | XEDS | Energy dispersive analysis of X-rays |
| | | XPS | X-ray photoelectron spectroscopy |
| USC | University of South Carolina | XRD | X-ray diffraction |
| USDA | U.S. Department of Agriculture | XRF | X-ray fluorescence |
| USFCC | United States Fuel Cell Council | Y | Yttrium |
| UTC FC | United Technologies Corporation Fuel Cells | Yb | Ytterbium |
| | | YSZ | Ytria-stablized zirconia |
| UTRC | United Technologies Research Center | ZnO | Zinc oxide |
| | | Zr | Zirconium |
| UV | Ultraviolet | ZrO ₂ | Zirconium dioxide |
| UV-Vis | Ultraviolet-Visual | | |

