

Acronyms, Abbreviations, and Definitions

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|--------------------|--|----------|---|
| (AD)Fe-N-C | atomically dispersed iron-nitrogen-carbon (catalyst) | AMRL | active magnetic regenerative liquefier |
| (CM+PANI)-Fe(Zn)-C | cyanimide- and polyaniline-derived iron-(zinc)-nitrogen-carbon | ANL | Argonne National Laboratory |
| (Fe,Zn)-ZIF | zinc and iron zeolitic imidazolite framework | ANSI | American National Standards Institute |
| ¹ H NMR | proton (¹ H) nuclear magnetic resonance | AOP | Annual Operating Plan |
| 2DM | two-dimensional manufacturing | API | application program interface |
| 2PB | two-phase boundary | ARPA-E | Advanced Research Projects Agency–Energy |
| 30k SW | 30,000 square wave | ASR | area specific resistance |
| 3-D | three dimensional | AST | accelerated stability test; accelerated stress test |
| 3D | three dimensional | at % | atomic percent |
| 3PB | three-phase boundary | ATM-PP | benzyltrimethylammonium functionalized Diels-Alder poly(phenylene) |
| a | symmetry factor | ATO | antimony-doped-tin-oxide |
| AB | acetylene black | AVT | A. V. Tchouvelev & Associates, Inc. |
| ABS | American Bureau of Shipping | AWSM | advanced water splitting materials |
| AC | activated carbon | B | magnetic induction (T) |
| ACI | ACI Services, Inc. | b | relative humidity dependence; Tafel slope |
| AEM | alkaline exchange membrane; anion exchange membrane | BCF | a new triple conducting O ₂ electrode with composition protection |
| AEMEI | alkaline exchange membrane electrolyzer | BCFCo0.2 | BaCe _{0.4} Fe _{0.4} Co _{0.2} O _{3-δ} |
| AEMFC | anion exchange membrane fuel cell | BCFZY0.1 | BaCo _{0.4} Fe _{0.4} Zr _{0.1} Y _{0.1} O _{3-δ} |
| AFC | alkaline fuel cell | BCZY63 | BaCe _{0.6} Zr _{0.3} Y _{0.1} O _{3-δ} |
| AFCB | American Fuel Cell Bus | BCZYS10 | a new electrolyte with composition protection |
| AFDC | Alternative Fuels Data Center | BCZYYb | BaCe _{0.7} Zr _{0.1} Y _{0.1} Yb _{0.1} O _{3-δ} |
| AFM | atomic force microscopy | BEB | battery electric bus |
| AFV | alternative fuel vehicle | BET | Brunauer-Emmett-Teller |
| AHJ | authority having jurisdiction | BJH | Barrett, Joyner, and Halenda adsorption |
| AHMF | Advanced Hydrogen Mobile Fueler | BN | boron nitride |
| AIChE | American Institute of Chemical Engineers | BN-TiN | boron nitride–titanium nitride |
| ALD | atomic layer deposition | BOE | beginning of experiment |
| AMFC | alkaline membrane fuel cell | | |
| AMR | active magnetic regenerator; Annual Merit Review | | |

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|------------------|--|-----------------|---|
| BoL | beginning of life | CFD | computational fluid dynamics |
| BOP | balance of plant | CH | chemical hydrogen storage |
| BOT | beginning of test | cH ₂ | compressed hydrogen |
| BP | budget period | CHE | computational hydrogen electrode |
| BP | Black Pearls (type of a high-surface-area carbon) | CHS | Center for Hydrogen Safety |
| BPA | bipolar plate assembly | CL | catalyst layer |
| BP-Ar(Fx) | perfluoroalkylsulfonate polymer(s) | CMU | Carnegie Mellon University |
| BPM | bipolar membrane | CMVSS | Canadian Motor Vehicle Safety Standard |
| BPN | alkyl ammonium functionalized poly(biphenylene)s; quaternized poly(biphenylene) | CNF | carbon nanofibers |
| BPP | bipolar plate | CNG | compressed natural gas |
| BTMAOH | benzyltrimethyl ammonium hydroxide | Co | cobalt |
| BU | Boston University | CO ₂ | carbon dioxide |
| BYZ | barium yttrium zirconate | COC | cyclic olefin copolymer |
| BZCYYb | BaZr _{0.7} Ce _{0.1} Y _{0.1} Yb _{0.1} O _{3-δ} ; cerium and ytterbium-doped barium yttrium zirconate | COC-Phs | cyclic olefin polymer with phenyl substituent |
| C5 | five-carbon sugar (hemicellulose) | COF | covalent organic framework |
| C6 | six-carbon sugar (cellulose) | COP | coefficient of performance (a measure of relative efficiency of a refrigerator stage) |
| CAE | cathodic arc evaporation | COPV | composite overwrapped pressure vessel |
| CaFCP | California Fuel Cell Partnership | CPNUVV | Cross-Polarized Near-Ultraviolet/Visible system |
| CAN | controller area network | cPPSA | crosslinkable poly(phenylene sulfonic acid) |
| CAN 2.0A | Controller Area Network Version 2.0A | CRADA | Cooperative Research and Development Agreement |
| CAN 2.0B | Controller Area Network Version 2.0B | CRC | cyclic redundancy check |
| CARB | California Air Resources Board | CS | carbon steel |
| CBP | consolidated bioprocessing | CSA | Canadian Standards Association |
| CcH ₂ | cryo-compressed hydrogen | CSA | compact solid oxide electrolysis cell architecture |
| CCL | cathode-catalyst layer | CTE | coefficient of thermal expansion |
| CCM | catalyst coated membrane | D | diameter |
| CCPM3 | California Climate Policy Modeling | d | de-alloyed |
| CDO | code development organization | D-A | Dubinin-Astakhov |
| CDP | composite data product | DAPP | Diels-Alder poly(phenylene) |
| CEC | California Energy Commission | dc | cathode electrode thickness |
| CF | carbon fiber | DEG | differentially expressed gene |

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|-----------|---|---------|--|
| DER | distributed energy resource | EDC | Energy Dispatch Controller |
| DF | direct fermentation | EDS | energy-dispersive X-ray spectroscopy |
| DFMA | Design for Manufacture and Assembly | EDTA | ethylenediaminetetraacetic acid |
| DFT | density functional theory | EELS | electron energy loss spectroscopy |
| dge | diesel gallon equivalent | EERE | Office of Energy Efficiency and Renewable Energy |
| DLHub | Data and Learning Hub for Science | EG | ethylene glycol |
| DLS | dynamic light scattering | EHC | electrochemical hydrogen compressor |
| DMA | dynamic mechanical analysis | EIS | electrochemical impedance spectroscopy |
| DMAc | N,N-dimethylacetamide | EL | electrolyzer |
| DME | dimethyl ether | EMFAC | emission factor |
| DMFC | direct methanol fuel cell | EMN | Energy Materials Network |
| DMR | de-acetylated and mechanically refined | ENG | expanded natural graphite |
| DMSO | dimethylsulfoxide | EOD | electro-osmotic drag |
| DMTA | dynamic mechanical thermal analysis | EoL | end of life |
| DOE | U.S. Department of Energy | EOT | end of test |
| DOE/FCCJ | U.S. Department of Energy/Fuel Cell Commercialization Conference of Japan | EPDM | ethylene propylene diene monomer rubber |
| DOT | U.S. Department of Transportation | ePTFE | expanded polytetrafluoroethylene |
| DR | demand response | Er | erbium |
| DRI | direct iron reduction | ERMS | Emissions Research and Measurement Section |
| DRIFTS | diffuse reflectance infrared Fourier transform spectroscopy | ETF | elevated temperature forming |
| DRTS | digital real-time simulator | ETFE | ethylene tetrafluoro ethylene polymer |
| DSC | differential scanning calorimetry | EV | battery electric vehicle |
| DSM 1313 | Deutsche Sammlung von Mikroorganismen 1313 | EW | equivalent weight |
| DSRC | dedicated short-range communication | EXAFS | extended X-ray absorption fine structure |
| Dy | dysprosium | F- | fluoride anion |
| $E_{1/2}$ | half wave potential | FASTSim | Future Automotive Systems Technology Simulator |
| E3 | Energy and Environmental Economics | FC | fold change; fuel cell |
| ECA | electrochemically active surface area | FCA | fuel cell assembly |
| ECCC | Environment and Climate Change, Canada | FCEB | fuel cell electric bus |
| ECSA | electrochemical surface area | FCET | fuel cell electric truck |

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|------------------|--|--------------------------------|---|
| FCEV | fuel cell electric vehicle | GEN-III | third generation active magnetic regenerative refrigerator prototype (120 K to 20 K span) |
| FCH JU | Fuel Cell and Hydrogen Joint Undertaking | | |
| FC-PAD | Fuel Cell Performance and Durability Consortium | GGE | gasoline gallon equivalent |
| FCPP | fuel cell power plant | GH ₂ | gaseous hydrogen |
| FCS | fuel cell system | GISAXS | grazing incident small-angle X-ray spectroscopy |
| FCTO | Fuel Cell Technologies Office | GM | General Motors |
| FCTO MYRDD | Fuel Cell Technologies Office Multi-Year Research, Development, and Demonstration Plan | GN ₂ | gaseous nitrogen |
| FCV | fuel cell vehicle | GNG | go-no go |
| FE | finite element | GO | graphene oxide |
| Fe | iron | GTR | Global Technical Regulation |
| Fe,TM-N-C | iron-(transition metal)-nitrogen-carbon catalyst | GUI | graphical user interface |
| FEC | frond end controller | GWE | Greenway Energy, LLC |
| FeN ₄ | iron atom coordinated to four nitrogen atoms | H | magnetic field strength (A/m) |
| FeN _x | iron atom coordinated to “x” nitrogen atoms | H ₂ | hydrogen |
| F-MEC | fermentation and microbial electrolysis cell | H ₂ -O ₂ | hydrogen–oxygen (e.g., fuel cell) |
| FMVSS | Federal Motor Vehicle Safety Standard | H ₂ btdd | bis(1 <i>H</i> -1,2,3-triazolo[4,5- <i>b</i>],[4',5'- <i>i</i>])dibenzo[1,4]dioxin] |
| FOA | funding opportunity announcement | H ₂ PhOHpydc | 6-(4-carboxy-2-hydroxyphenyl) nicotinic acid |
| FOM | figure of merit | H70 | hydrogen service at 70 bar or 70 MPa |
| FPM | feet per minute | HAADF | high-angle annular dark-field |
| FTA | Federal Transit Administration | HAADF-STEM | high-angle annular dark field–scanning transmission electron microscopy |
| FTIR | Fourier transform infrared spectroscopy | HCD | high current density; hydrogen contaminant detector |
| FY | fiscal year | HCDP | hydroxide ceramic dual phase |
| g | O ₂ partial pressure dependence | HCF | hollow carbon fiber |
| g/s | grams per second | HDPE | high-density polyethylene |
| GCMC | grand canonical Monte Carlo | HDSAM | Hydrogen Delivery Scenario Analysis Model |
| Gd | gadolinium | HDV | heavy-duty vehicle |
| GDC | Gd _{0.1} Ce _{0.9} O _{1.95} | HeIM | helium ion microscopy |
| GDE | gas diffusion electrode | HER | hydrogen evolution reaction |
| GDL | gas diffusion layer | HEV | hybrid electric vehicle |
| | | HTEC | Hydrogen Technology & Energy Corporation |
| | | HF | hollow fiber |

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|----------|---|-------------------|---|
| HFO | hydrous ferric oxide | ICP-OES | inductively-coupled plasma–optical emission spectrometry |
| HFP | hexafluoropropylene | ICR | interface contact resistance |
| HFPO | hexafluoropropylene oxide | IEC | ion exchange capacity |
| HFR | high frequency resistance | IEEE | Institute of Electrical and Electronics Engineers |
| HGV | hydrogen gas vehicle | IFC | International Fire Code |
| HHC | Hawaii Hydrogen Carriers | IL | ionic liquid |
| HIL | hardware-in-the-loop | ILSS | inter-lamellar shear strength |
| HiP | High Pressure Equipment Company | INL | Idaho National Laboratory |
| HiPoD | High Power Density Cell | IR | infrared |
| HITRF | Hydrogen Infrastructure Testing and Research Facility | iR-free | voltage/potential corrected for cell resistance |
| H-Mat | Hydrogen Materials Compatibility Consortium | ISO | International Organization for Standardization |
| HOR | hydrogen oxidation reaction | IT | intermediate temperature |
| HPI | High Pressure Institute of Japan | ITFC | intermediate-temperature fuel cell |
| HSA | high surface area | IUPUI | Indiana University Purdue University Indianapolis |
| HSC | high surface area carbon | JRC | Joint Research Centre |
| HSE | Health and Safety Executive (United Kingdom) | KB | Ketjen black |
| HSECoE | Hydrogen Storage Engineering Center of Excellence | kMC | kinetic Monte Carlo |
| HSP | Hydrogen Safety Panel | kW _{net} | net kilowatt electric |
| HTE | high-temperature electrolysis | L | length |
| HTF | heat transfer fluid | L/D | length-to-diameter ratio |
| HT-PEMFC | high-temperature proton exchange membrane fuel cell | L3DP | laser 3-D printing |
| HTS | high-throughput screening | LAMMPS | Large-scale Atomic/Molecular Massively Parallel Simulator |
| HTWS | high-temperature water splitting | LANL | Los Alamos National Laboratory |
| HX | heat exchanger | LBNL | Lawrence Berkeley National Laboratory |
| HyMARC | Hydrogen Materials Advanced Research Consortium | LCA | life cycle analysis |
| HyRAM | Hydrogen Risk Assessment Model | LCD | low current density |
| HyWAM | Hydrogen Wide Area Monitoring | LCOS | levelized cost of storage |
| I/C | ionomer-to-carbon ratio | LDC | lanthanum doped ceria |
| I:C | ionomer-to-carbon ratio | LDV | light-duty vehicle |
| ICC | International Code Council | LGER | linear Gibbs energy relationship |
| ICHS | International Conference on Hydrogen Safety | LH ₂ | liquid hydrogen |
| | | LHC | liquid hydrogen carrier |

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|-----------------|--|-----------------------|--|
| LIN | liquid nitrogen | MgB ₂ -THF | magnesium boride reacted with tetrahydrofuran |
| LLNL | Lawrence Livermore National Laboratory | MH | metal hydride |
| LME | laboratory mixing extruder | MHC | metal hydride compressor |
| LMRC | linear motor reciprocating compressor | MIST | multichannel impedance spectroscopy |
| LN ₂ | liquid nitrogen | ML | machine learning; monolayer |
| LNO | lanthanum nickelate | MMC | multiple metal center |
| LOHC | liquid organic hydrogen carrier | MMT | million metric ton |
| LP | low pressure | Mn | manganese |
| LP@PF | low Pt@PGM-free | MO | metal oxide |
| LP@PFNF | low Pt@PGM-free nanofiber | MOF | metal organic framework |
| LSCF | (La,Sr)(Co,Fe)O ₃ | MOR | methanol oxidation reaction |
| LSCr | La _{0.7} Sr _{0.3} CrO ₃ | MPa | megapascal |
| LTE | low-temperature electrolysis | MPL | microporous layer |
| LT-PEMFC | low-temperature proton exchange membrane fuel cell | MPP | metal pyrophosphate |
| M | magnetization (A/m) | MRS | Materials Research Society |
| <i>m-dobdc</i> | 4,6-dioxido-1,3-benzenedicarboxylate | MS | milestone |
| M/HDV | medium- and heavy-duty vehicle | MT | metric ton |
| MA | mass activity | MYRDD | Multi-Year Research, Development, and Demonstration Plan |
| MarFC | Maritime Fuel Cell Unit | n | number of electrons |
| MASC | multi-acid side chain | N | number of cycles |
| MATI | modular adsorbent tank insert | NA | not applicable |
| MAWP | maximum allowable working pressure | NACFE | North American Council for Freight Efficiency |
| MBRC | miles between roadcall | nano-CT | nanoscale-resolution (~50 nm) X-ray computed tomography; nano-computed tomography |
| MCE | magnetocaloric effect | NBR | nitrile butadiene rubber |
| MCH | methylcyclohexane | NBSCF | NdBa _{0.5} Sr _{0.5} Co _{1.5} Fe _{0.5} O _{5+δ} |
| MCHL | magnetocaloric hydrogen liquefier | NDA | non-disclosure agreement |
| MD | molecular dynamics | NDC | neodymium doped ceria |
| MDF | Materials Data Facility | NF | nanofiber |
| MDV | medium-duty vehicle | NFCTEC | National Fuel Cell Technology Evaluation Center |
| MDV/HDV | medium- and heavy-duty vehicle | NFPA | National Fire Protection Association |
| MEA | membrane electrode assembly | NG | natural gas |
| MEC | microbial electrolysis cell | | |
| MFCS | multi-functional carbon support | | |

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|------------------------------|--|------------|---|
| NH ₃ | ammonia | ·OOH | hydroperoxyl radical |
| NIR | near-infrared | OQMD | Open Quantum Materials Database |
| NIST | National Institute of Standards and Technology | ORNL | Oak Ridge National Laboratory |
| NMR | nuclear magnetic resonance | ORR | oxygen reduction reaction |
| NNO | neodymium nickelate | P | pressure |
| NO | nitric oxide | P&ID | pipng and instrumentation diagram |
| NO ₂ ⁻ | nitrite anion | PAA | poly(acrylic acid) |
| NPA | 1-propanol | PADD | Petroleum Administration for Defense Districts |
| NR | neutron reflectometry | PAN | polyacrylonitrile |
| NREL | National Renewable Energy Laboratory | PA-PBI | phosphoric acid poly(benzimidazole) |
| NRTL | Nationally Recognized Testing Laboratory | PAP-TP-Me | poly(aryl piperidine) triphenyl methyl |
| NRVS | nuclear resonance vibrational spectroscopy | PAP-TP-MQN | poly(aryl piperidine) triphenyl mono quaternary ammonium |
| NSF DMREF | National Science Foundation Designing Materials to Revolutionize and Engineer our Future | PBCC | PrBa _{0.8} Ca _{0.2} Co ₂ O _{5+δ} |
| NSTF | nanostructured thin film | PBE | Perdew–Burke–Ernzerhof |
| NTCNA | Nissan Technical Center North America | PBEsol | Perdew–Burke–Ernzerhof revised for solids |
| NTO | niobium-doped titanium oxide | PBI | polybenzimidazole |
| NU | Northwestern University | PBSCF | PrBa _{0.5} Sr _{0.5} Co _{1.5} Fe _{0.5} O _{5+δ} |
| O&M | operations and maintenance | PCES | protonic ceramic electrolyzer stack |
| O ₂ | oxygen molecule | PCM | proton conducting membrane |
| OBU | onboard unit—DSRC radio with a vehicle | PCT | pressure, composition, temperature |
| OCV | open cell voltage; open circuit voltage | PDF | pair distribution function analysis |
| OEM | original equipment manufacturer | PDTS | [ISO designation yet to be assigned] Health indicators definitions, relationships and attributes, was prepared by Technical Committee ISO/TC 215, Health Informatics / Working Group 1 Health records and modeling coordination |
| OER | oxygen evolution reaction | PEC | photoelectrochemical |
| OFeN ₄ | iron atom coordinated to four nitrogen atoms and one oxygen atom | PEFC | polymer electrolyte fuel cell |
| OH | hydroxyl group | PEM | polymer electrolyte membrane; proton exchange membrane |
| OHFeN ₄ | iron atom coordinated to four nitrogen atoms and one hydroxyl group | PEMFC | polymer electrolyte membrane fuel cell; proton exchange membrane fuel cell |
| OLR | organic loading rate | | |

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|-----------------------------------|---|---------|---|
| PEMWE | proton exchange membrane water electrolyzer | PVD | physical vapor deposition |
| PEO | poly(ethylene oxide) | PVDF | polyvinylidene fluoride |
| PF | perfluoro | PVP | Pressure Vessels and Piping (Division of ASME) |
| PFD | process flow diagram | Q | heat; stack heat load |
| PFIA | perfluoro imide-acid | QA | quaternary ammonium |
| PFSA | perfluorinated sulfonic acid; perfluorosulfonic acid | QAPOH | biphosphate-quaternary ammonium poly(phenylene) |
| PG&E | Pacific Gas and Electric | QC | quality control |
| PGM | platinum group metal | QRA | quantitative risk analysis; quantitative risk assessment |
| PGM-free | platinum group metal-free | R | gas constant |
| PhNB | phenylnorbornene | R&D | research and development |
| PILBCP | polymerized ionic liquid block copolymer | R2R | roll to roll |
| PNC | PrNiCoO ₃ | RCO | relevant cost of ownership |
| PNNL | Pacific Northwest National Laboratory | RCS | regulations, codes, and standards |
| PNO | Pr ₂ NiO _{4+δ} | RDA | rotating disk atomizer |
| pO ₂ | oxygen partial pressure | RDE | rotating disk electrode |
| ppb | parts per billion | ReSOC | reversible solid oxide cell |
| ppm | parts per million | RH | relative humidity |
| PPSU | poly(phenyl sulfone) | RHE | reversible hydrogen electrode |
| PRESLHY | Prenormative Research for the Safe Use of Liquid Hydrogen | RLRS | rapid laser reactive sintering |
| PS | polystyrene | RMSE | root mean square error |
| PSA | pressure swing adsorption | RNA-seq | ribonucleic acid sequencing |
| PSD | particle size distribution | RPI | Rensselaer Polytechnic Institute |
| psi | pound-force per square inch | RRDE | rotating ring-disk electrode |
| psig | pounds per square inch gauge | RSU | roadside unit—stationary DSRC radio installed inside the dispenser system |
| Pt | platinum | RTO | ruthenium dioxide–titanium dioxide |
| Pt/C | carbon-supported platinum | RTS | real-time simulation |
| Pt/MFCS | platinum/multi-functional carbon support | s/c | superconducting magnet |
| PtCo | platinum cobalt alloy | SA | Strategic Analysis Inc. |
| PTE | porous transport electrode | SAE | SAE International |
| PTFE | polytetrafluoroethylene | SAXS | small angle X-ray scattering |
| PTL | porous transport layer | SBIR | Small Business Innovation Research |
| PtRu | platinum ruthenium | sc | cathode ionic conductivity |
| Pt _x Co _{1-x} | platinum-cobalt alloy | | |

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|---------|--|----------------|---|
| SCAN | strongly constrained and appropriately normed | STEM-EDS | scanning transmission electron microscopy with energy-dispersive X-ray spectroscopy |
| sccm | standard cubic centimeters per minute | STF | $\text{Sr}(\text{Ti}_{0.3}\text{Fe}_{0.7})\text{O}_3$ |
| SCE | Southern California Edison | STFC | $\text{Sr}(\text{Ti}_{0.3}\text{Fe}_{0.63}\text{Co}_{0.07})\text{O}_3$ |
| SCS | safety, codes and standards | STTR | Small Business Technology Transfer |
| SDO | standards development organization | STXM | scanning transmission X-ray microscopy |
| SEBS | poly(styrene-b-(ethylene-co-butylene)-b-styrene) | SwRI | Southwest Research Institute |
| SEM | scanning electron microscopy | sys/yr | systems per year |
| SERA | Scenario Evaluation and Regionalization Analysis | T | temperature |
| SES | poly(styrene-b-ethylene-b-styrene) | TBD | to be determined |
| SFR | stagnation flow reactor | T_c | catalyst coated layer temperature |
| SG | Saint-Gobain | TCF | Technology Commercialization Fund |
| SIO | Scripps Institution of Oceanography | TCO | total cost of ownership |
| SLD | scattering length density | TCOLD | average cold temperature of a regenerator |
| SMR | steam methane reforming | TEA | techno-economic analysis |
| SMSI | strong metal support interaction | TEM | transmission electron microscopy |
| SNL | Sandia National Laboratories | TEM-EDS | transmission electron microscopy with energy-dispersive X-ray spectroscopy |
| SOA | state of the art | TEM-EELS | transmission electron microscopy with electron energy loss spectroscopy |
| SOE | solid oxide electrolysis | TF-RDE | thin-film rotating disk electrode |
| SOEC | solid oxide electrolysis cell | T_g | glass transition temperature |
| SOFC | solid oxide fuel cell | TGA | thermogravimetric analysis |
| SPP | solid phase processing | THF | tetrahydrofuran |
| SPPARKS | Stochastic Parallel PARTICle Kinetic Simulator | T_{HOT} | average hot temperature of a regenerator |
| SPS | suspension plasma spray | TiN | titanium nitride |
| SPt | platinum surface roughness | TiO_x | titanium oxide |
| SR | stoichiometry | TIR | Technical Information Report |
| SRNL | Savannah River National Laboratory | TKK | Tanaka Kikinok |
| SS | stainless steel | TMA | trimethylamine; trimethylammonium |
| SSM | sacrificial support method | TMAB | tetramethylammonium borohydride |
| SSRS | solid state reactive sintering | | |
| STCH | solar thermochemical hydrogen | | |
| STEM | scanning transmission electron microscopy | | |

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| TMAC6PP | hexamethyl ammonium functionalized Diels-Alder poly(phenylene) | VACNF | vertically aligned carbon nanofibers |
| TPD | temperature programmed desorption | VC | Vulcan carbon |
| TPN | alkyl ammonium functionalized poly(terphenylene)s | VCC | vapor compression cycle |
| TPP | tin pyrophosphate | VTIR | variable temperature infrared |
| TPV | total present value | WaMM | water management membrane |
| T _r | reference temperature, 353 K | WAVE | Wireless Access in Vehicular Environments |
| TRL | technology readiness level | WAXS | wide-angle X-ray scattering |
| TS | Technical Standard | wt % | weight percent |
| TTA | technology transfer agreement | X | mole fraction |
| TUS | take up system | XAFS | X-ray adsorption fine structure spectroscopy |
| UALR | University of Arkansas at Little Rock | XANES | X-ray absorption near edge structure spectroscopy |
| UCD | University of California, Davis | XAS | X-ray absorption spectroscopy |
| UK CAER | University of Kentucky Center for Applied Energy Research | XCT | X-ray computed tomography |
| ULCL | ultra-low catalyst loading | XPS | X-ray photoelectron spectroscopy |
| UN | United Nations | XRD | X-ray diffraction |
| UPS | United Parcel Service | XRF | X-ray fluorescence |
| URFC | unitized reversible fuel cell | XRS | X-ray Raman scattering |
| USAXS | ultra-small angle X-ray scattering | YSZ | 3% yttria-stabilized zirconium oxide |
| USCG | United States Coast Guard | YSZ | (ZrO ₂) _{0.92} (Y ₂ O ₃) _{0.08} |
| UTF | ultra-thin film | ZIF | zeolitic imidazolate framework |
| UTRC | United Technologies Research Center | Zn | zinc |
| UV-Vis | ultraviolet to visible (wavelength) | Z-N | Ziegler-Natta |
| VACD | variable area control device | ZSM-5 | Zeolite Socony Mobil-R, an aluminosilicate zeolite with the chemical formula Na _n Al _n Si _{96-n} O ₁₉₂ ·16 H ₂ O (0<n<27) |