

XIV. Acronyms, Abbreviations and Definitions

α -AlH ₃	Alpha polymorph of aluminum hydride	6FPAEB-BPS100	Hexafluoro bisphenol A benzonitrile-biphenyl sulfone
~	Approximately		
@	At		
°C	Degrees Celsius	8YSZ	8 mol% yttria-stabilized zirconia
°F	Degrees Fahrenheit	a.k.a.	Also known as
Δ	Change, delta	A	Ampere, amps
ΔG	Gibbs free energy of reaction	Å	Angstrom
ΔH	Enthalpy of reaction, Enthalpy of hydrogenation	AB	Ammonia-borane, NH ₃ BH ₃
ΔH_f°	Standard heat of formation	ABH ₂	Ammonium borohydride, NH ₄ BH ₄
ΔK	Stress intensity factor	AC	Alternating current
ΔP	Pressure drop, pressure change	ACC	Advanced anode catalyst
≈	Equals approximately	ACF	Activated carbon fibers
>	Greater than	A/cm ²	Amps per square centimeter
≥	Greater than or equal to	ACN	Acetonitrile
<	Less than	ACNT	Aligned carbon nanotube
≤	Less than or equal to	AC Transit	Alameda Contra Costa Transit
μCHP	Micro-combined heat and power	AD	Anaerobic digestion; Anode dew point
μCHX	Microscale combustor/heat exchanger	ADG	Anaerobic digester gas
μc-Si	Microcrystalline silicon	AEM	Anion exchange membrane; Analytical electron microscopy
μm	Micrometer(s), micron(s)	AEO	Annual Energy Outlook
η	Viscosity	AER	Absorption-enhanced reforming; All-electric range
#	Number	AFDC	Alternative Fuels Data Center
Ω	Ohm(s)	AFM	Atomic force microscopy; Anti-ferromagnetic
Ω/cm ²	Ohm(s) per square centimeter	AFP	Automated fiber placement
Ω-cm ²	Ohm-square centimeter	AFV	Alternative fuel vehicle
%	Percent	Ag	Silver
®	Registered trademark	AGC	Activated graphitic carbon
\$	United States dollars	AgCl	Silver chloride
¹¹ B-NMR	Boron 11 nuclear magnetic resonance	A-h	Amp-hour
1-D, 1D	One-dimensional	AHJ	Authorities having jurisdiction
1Q	First quarter of the fiscal year	AIR	Average individual risk
2-D, 2D	Two-dimensional	AISI	American Iron & Steel Institute
2Q	Second quarter of the fiscal year	AIST	Japanese National Institute of Advanced Industrial Science and Technology
3-D, 3D	Three-dimensional	AK	Alkali
3DSM	Dimensionally stable membrane with 3-dimensional porous support	Al	Aluminum
3Q	Third quarter of the fiscal year	Al ₂ O ₃	Aluminum oxide
3-L	Three-layer	ALARP	As low as reasonably practicable
4Q	Fourth quarter of the fiscal year	Al-AB	Aluminum-ammonia-borane
5-L	Five-layer	AlCl ₃	Aluminum chloride

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ALD	Atomic layer deposition	ATR	Autothermal reformer; Autothermal reforming; Attenuated total reflection
AlH ₃	Aluminum hydride; Alane	ATR-FTIR	Attenuated total reflectance Fourier transform infrared
ALS	Advanced Light Source at Lawrence Berkeley National Laboratory	a.u.	Arbitrary units
ALT	Accelerated life test	Au	Gold
AM	Air mass	AuS	Gold sulfide
AM 1.5	Air Mass 1.5 solar illumination	AuSnO _x	Gold supported on hydrous tin oxide
AM1.5G	Air Mass 1.5 Global (solar spectrum)	AuTiO _x	Gold supported on titanium oxide
AMBH	Amminine metal borohydride	Autonomie	Plug-and-Play Powertrain and Vehicle Model Architecture and Development Environment software model by Argonne National Laboratory to support the rapid evaluation of new powertrain/propulsion technologies for improving fuel economy through virtual design and analysis in a math-based simulation environment
AMC	Aminomethyl-cyclohexane		
AMR	Annual Merit Review		
AMR	Active magnetic regenerator		
AMRL	Active magnetic regenerative liquefier		
AMRR	Active magnetic regenerative refrigerator		
AN	Acrylonitrile		
ANL	Argonne National Laboratory	Avg	Average
ANOVA	Analysis of variance	AZO	Aluminum zinc oxide
ANSI	American National Standards Institute	¹¹ B-NMR	Boron 11 nuclear magnetic resonance
A ₀	Arrhenius constant, ml/[cm ² -min-atm ^{1/2}]; Availability	B	Boron
APCI, APCi	Air Products and Chemicals, Inc.	B ₂ O ₃	Boron oxide; Diboron trioxide
APD	3-aminopropane-1,2-diol	Ba	Barium
APR	Aqueous-phase reforming	Bara	Bar absolute
APU	Auxiliary power unit	barg	Bar gauge
AQMD	Air Quality Management District	BBC	4,4',4''-(benzene-1,3,5-triyl-tris(benzene-4,1-diyl))tribenzoate
Ar	Argon	BCC	Body-centered cubic
ARRA	American Recovery and Reinvestment Act	BCN	Boron carbon nitride
As	Arsenic	Be	Beryllium
ASAXS	Anomalous small-angle X-ray scattering	BES	Basic Energy Sciences office within the DOE Office of Science
a-Si	Amorphous silicon	BET	Brunauer-Emmett-Teller surface area analysis method
a-SiC	Amorphous silicon carbide	BEV	Battery electric vehicle
a-SiGe	Amorphous silicon germanium	BFZ0	BaFe _{0.975} Zr _{0.025} O ₃
a-SiN	Amorphous silicon nitride	BFZ1	BaFe _{0.90} Zr _{0.10} O ₃
ASME	American Society of Mechanical Engineers	BG-DW	65% bio-glycol-35% distilled water
ASPEN	Modeling software, computer code for process analysis	B-G	Boron doped graphitic material
ASR	Area-specific resistance	B-H	Boron/hydrogen bond
AST	Accelerated stress test	B-H, BH, BH ₄	Borohydride
ASTM	ASTM International, originally known as the American Society for Testing and Materials	Bi	Bismuth
AT	Ammonia tritorane	BILI	Bio-derived liquid fuels
at%	Atomic percent	BILP	Benzimidazole-linked-polymers
atm	Atmosphere	BisSF	Bisphenol-sulfone
ATP	Adenosine triphosphate; Advanced Technology Program	BLP	Borazine-linked polymers
ATPase	Adenosine triphosphatase		

bmimBF ₄	1-butyl-3-methyl-imidazolium tetrafluoroborate	BTC	1,3,5-benzenetricarboxylate
bmimCl	1-butyl-3-methyl-imidazolium chloride	BTE	4,4',4''-(benzene-1,3,5-triyltris(ethyne-2,1-diyl))tribenzoate
BmimOTf	1-butyl-3-methyl-imidazolium triflate	BTT	Benzene tris-tetrazole
bmimPF ₆	1-butyl-3-methyl-imidazolium hexafluorophosphate	BTTCD	Octa-carboxylate ligand
BMPFFP	1-butyl-1-methyl-pyrrolidinium tris(pentafluoroethyl)trifluorophosphate	BTU, Btu	British thermal unit(s)
BN	Boron-nitrogen	Bu ₃ SnCl	Tributyltin chloride
BNH	Boron-nitrogen-hydrogen	Bu ₃ SnSnBu ₃	Hexabutyl-distannane
BNHx	Dehydrogenated ammonia-borane	BV	Benzyl viologen
BNL	Brookhaven National Laboratory	BxHy	Polyhedral boranes
BNNT	Boron nitride nanotubes	BZYC	BaZr _{0.1} Ce _{0.7} Y _{0.1} Yb _{0.1} O _{3-δ}
B-O	Any oxidized boron species, borate	C	Carbon
Boc	Tert-butoxycarbonyl	C	Coulomb
B(OH) ₃	Boric acid	C ₂ H ₄	Ethylene
BOL	Beginning of life	C ₂ H ₆	Ethane
BOP, BoP	Balance of plant	C ₃ H ₈	Propane
BOT	Beginning of test	Ca	Calcium
BP	Bisphenol; Biphenyl	CA	Carbon aerogel
bpe	Bis(4-pyridyl)ethane	CA	Chronoamperometry
BPEE	1,2-bipyridylethene	CaBr ₂	Calcium bromide
BPDC	Biphenyl-4,4'-dicarboxylate	CaCO ₃	Calcium carbonate
BPP	Bipolar plate	CAD	Computer-aided design
BPPPO	Biphenol-based phenyl phosphine oxide	CAE	Computer-assisted engineering
BPPPO-35	Biphenol-based phenyl phosphine oxide copolymer, 35% molar fraction of disulfonic acid unit (35% level of sulfonation)	CAER	Center for Applied Energy Research
BPS	Ballard Power Systems	CaFCP	California Fuel Cell Partnership
BPS	Bi Phenyl Sulfone	CaI	<i>Clostridium acetobutylicum</i> hydrogenase
BPS100	Fully disulfonated poly(arylene ether sulfone)	CaO	Calcium oxide
BPSH	Block polysulfone ether polymer	CARB	California Air Resources Board
BPSH	Bi Phenyl Sulfone: H Form	CaS	Calcium sulfide
BPSH-30	Biphenyl sulfone H form, 30% molar fraction of disulfonic acid unit (30% level of sulfonation)	CaSFCC	California Stationary Fuel Cell Collaborative
BPSH-x	BiPhenyl based disulfonated polySulfone (H+ form) (x denotes degree of sulfonation)	CbHS	Carbon-based hydrogen storage
BPVC	Boiler and Pressure Vessel Code	CB	Conduction band
BPVE	Perfluorocyclobutane-biphenyl vinyl ether	CBM	Conduction band minimum
BPVE-6F	Perfluorocyclobutane-biphenyl vinyl ether hexafluoroisopropylidene	CBN	Carbon-boron-nitrogen
BPY	2,2'-bipyridine	CBS	Casa Bonita strain; Complete basis set
BPY	4,4'-bipyridine	cc	Cubic centimeter(s)
Br	Bromine	CCC	Carbon composite catalyst
Br ₂	Diatomic bromine	CCD	Charge-coupled device
BTB	1,3,5-benzenetribenzoate	CCF	Complex coolant fluid
		cc/g cat/hr	Cubic centimeter(s) per gram catalyst per hour
		CcH2	Cryo-compressed hydrogen
		CCHSS	Complex Compound Hydrogen Storage System
		CCM	Catalyst-coated membrane; Coordinate measuring machine

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Cc/min, ccm	Cubic centimeters per minute	CHSCoE	Chemical Hydrogen Storage Center of Excellence
ccp	Cubic close-packing	CI	Compression ignition
CCS	Carbon capture and storage	CIGSe ₂	Copper indium gallium diselenide
CC&S	Carbon capture and sequestration	CIGS	Copper indium gallium diselenide
CCVJ	9-([E]-2-carboxy-2-cyanovinyl)julolidine	CIRRUS	Cell Ice Regulation & Removal Upon Start-up
Cd	Cadmium	Cl	Chlorine
CD	Compact disk; Charge depleting; Cathode dewpoint	CL	Catalyst layer; ε-caprolactone
Cdl	Double layer capacitance	cm	Centimeter
cDNA	Complementary DNA	CM	Controls module
CDO	Code development organization	cm ²	Square centimeter
CDP	Composite data product	CMO	Conductive metal oxides
CdS	Cadmium sulfide	CMWNT	Carbon multi-walled nanotube
C-DSM™	Chemically etched dimensionally stable membrane	CN	Carbon-nitrogen
Ce	Cerium	CNC	Carbon nanocage
CEA	Commissariat à l'Énergie Atomique	CNF	Carbon nano-fiber
CEC	California Energy Commission	CNG	Compressed natural gas
CEM	Compressor/expander motor (module)	CNT	Carbon nanotube
CeO ₂	Ceric oxide	Co	Cobalt
CF	Carbon fiber; Carbon foam	CO	Carbon monoxide
CFC	Chlorofluorocarbon	CO ₂	Carbon dioxide
CFD	Computational fluid dynamics	COD	Chemical oxygen demand
CFF	Complex coolant fluid	COE	Cost of electricity
cfm	Cubic feet per minute	COF	Covalent-organic framework
CGA	Compressed Gas Association	COF ₂	Carbonyl fluoride
CGH2	Compressed gaseous hydrogen	COGS	Cost of goods sold
CGM	Charge-generating material	COMSOL	Multiphysics modeling and engineering simulation software
CGO	Cerium gadolinium oxide, Gd-doped CeO ₂	COPV	Composite overwrapped pressure vessel
CGS	Copper gallium diselenide, CuGaSe ₂	COS	Carbon oxysulfide; Carbonyl sulfide
CGSe ₂	Copper gallium diselenide	COx	Oxides of carbon
CH	Hydrogenated graphene	c _p	Specific heat
cH ₂	Compressed hydrogen gas	cp	Commercial purity
CH ₄	Methane	cP	Centipoise
CHARGEH2	GTI hydrogen cylinder filling model	CpI	<i>Clostridium pasteurianum</i> [FeFe]- hydrogenase
CHARM	Cost-effective High-efficiency Advanced Reforming Module	CPMAS	Cross polarization magic angle spinning
CHEX	Continuous catalytic heat exchanger	CPO, CPOX	Catalytic partial oxidation
CHHP	Combined heat, hydrogen, and power	c.p.s.	Counts per second
Chl	Chlorophyll	CPU	Computer processing unit
CHMCI	Test Method for Evaluating Material Compatibility for Compressed Hydrogen Applications – Phase I - Metals	CPV	Composite pressure vessel
CHP	Combined heat and power	Cr	Chromium
CHPFC	Combined heat and power fuel cell	CRADA	Cooperative Research and Development Agreement
CHS	Chemical hydrogen storage	Cs	Cesium
		C&S	Codes and standards

CSA	Canadian Standards Association	DEGDBE	Diethylene glycol dibutyl ether
CSA	Cell stack assembly	DEMS	Differential electrochemical mass spectroscopy
CSMP	Cabot Superior MicroPowders	ΔB_a	The difference in magnetic induction at high and low applied magnetic fields
CSTT	Codes and Standards Tech Team	ΔG	Gibbs free energy of reaction
CSU	California State University	ΔH	Enthalpy of reaction; Enthalpy of hydrogenation
CSULA	California State University Los Angeles	ΔH_f°	Standard heat of formation
CTA	Charge transfer agent	ΔK	Stress intensity factor
CTAB	Cetyl trimethyl ammonium bromide	ΔP	Pressure drop; Pressure change
CTB	Cyclotriborazane	DFM	Design for manufacturing
CTE	Coefficient of thermal expansion	DFMA [®]	Design for Manufacturing and Assembly
CTTRANSIT	Connecticut Transit	DFT	Density functional theory
Cu	Copper	DGDE	Di-ethylene glycol di-butyl ether
CU	University of Colorado	DHBC	2,5-dihydroxybenzene dicarboxylate
Cu ₂ O	Cuprous oxide	DI	Deionized; De-ionized water
cu in.	Cubic inch	DLC	Diamondlike carbon
CuNW	Copper nanowire	dL/g	Deciliters per gram
CuO	Cupric oxide; Copper(II) oxide	DM	Diffusion media
cu.yd.	Cubic yard(s)	DMA	Dynamic mechanical analysis
CV	Cyclic voltammetry; Cyclic voltammogram	DMA	Dimethylacetamide
CVD	Chemical vapor deposition	DMAc	Dimethyl acetamide
CVS	Chemical vapor synthesis	DMC	Diffusion Monte Carlo; Direct manufactured cost
CWRU	Case Western Reserve University	DMDF	2,5-dimethoxy 2,5-dihydrofuran
CY	Calendar year	DMDS	Dimethyldisulfide
CZO	Ceria-zirconia	DME	Dimethyl ether; Dimethoxyethane
d	Day(s)	DMEA	Dimethylethylamine
D ₂	Deuterium	DMEAA	Dimethylethylamine alane
D-A	Dubinin-Astakhov	DMF	n, n-di-methyl formamide
DAC	Diamond anvil cell	DMFC	Direct methanol fuel cell
DADB	Diammoniate of diborane, [(NH ₃) ₂ BH ₂][BH ₄]	dmimMeSO ₄	1,3-dimethyl-imidazolium methylsulfate
DAKOTA	Design Analysis Kit for Optimization and Terascale Applications	dmpe	Dimethylphosphinoethane
DB	Diborane (B ₂ H ₆)	DMPO	5,5-Dimethylpyrroline-N-oxide
dB(A)	Decibel(s) A scale	DMSO	Dimethyl sulfoxide
DBBPDSA	4, 4'-dibromobiphenyl 3, 3'-disulfonic acid, monomer	DMT	Dimethyltrityl
DBPDSA	1, 4-dibromo phenylene 2, 5-disulfonic acid	DMTHF	Dimethyltetrahydrofuran
DC	Direct current	DNA	Deoxyribonucleic acid
DCTDD	1,8-diazacyclotetradecane-2,7-dione	DNG	Desulfurized natural gas
DDMEFC	Direct dimethyl ether fuel cell	DNI	Direct normal insolation
DDP	Detailed Data Product	DOD	Depth of discharge
d_{DR}	Dubini-Radushkevich average micropore diameter	DOD	Department of Defense
DDR	A zeolite structure code	DOE	Department of Energy
DEF	Diethylformamide	DOT	Department of Transportation
Deg	Degree		

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DP	Dew point	EDX	Energy dispersive X-ray
DRIFTS	Diffuse reflectance infrared Fourier transform spectroscopy	EELS	Electron energy loss spectroscopy
DSC	Differential scanning calorimetry; Dynamic scanning calorimetry	EERE	U.S. DOE Office of Energy Efficiency and Renewable Energy
DSM TM	Dimensionally stable membrane	EFR-AHJ	Emergency first responder-authorities having jurisdiction
DSM-MC	Distance scaling method Monte Carlo	EFTE	Ethylene-tetrafluoroethylene
DVBPC	Divinyl aryl ether monomer	e.g.	<i>Exempli gratia</i> : for example
DVD	Digital video disk	EGR	Exhaust gas recirculation
DVMT	Daily vehicle miles traveled	EHC	Electrochemical hydrogen compressor
e ⁻	Electron	EHS	Environmental Health and Safety
E	Activation energy, kJ/mol	EIA	Energy Information Administration of the U.S. Department of Energy
E85	85%-15% blend of ethanol with gasoline	EIGA IGC	European Industrial Gases Association/Industrial Gases Council
E ₀ xE ₁	Utilization efficiency of incident solar light energy	EIHP	European Integrated Hydrogen Project
E _{1/2}	Half-wave potential	EIS	Electrochemical impedance spectroscopy
E _a	Activation energy	EISF	Elastic incoherent structure factor
E _{ad}	Hydrogen adsorption heat	ELAT [®]	Registered Trademark of De Nora North America, Inc., covers GDLs and GDEs
EAN	Ethylammonium nitrate	EMA	Effective medium approximation
EASA	Electrochemically active surface area	EMF	Electromagnetic field
E-BOP	Electrical balance of plant	EMI	Electro magnetic interference
EBSD	Electron backscatter diffraction	EMPA	Electron microprobe analysis
EC	European Commission; Electro-chemical	ENG	Expanded natural graphite
EC	Evaporative-cooled; Efficiency of conversion	eNMR	Electrochemical nuclear magnetic resonance
EC	Electrochemical capacitance	EODC	Electro-osmotic drag coefficient
EC	Early commercial	EOL	End of life
ECA	Electrochemical area	EOT	End of test
ECA	Estimated surface area	EPA	Environmental Protection Agency
ECB	Ethylcyclobutane	EPDM	Ethylene propylene diene monomer
ECC	Electrochemical compressor; Engineered cementitious composite	EPHC	Ethylperhydrocarbazole
ECE	Economic Commission for Europe	ePTFE	Expanded polytetrafluoroethylene
ECS	Equilibrium crystal shape	ER	Emergency responder
ECSA	Electrochemically active surface area; Electrochemical surface area; Effective catalyst surface area	ERW	Electric resistance weld
ED	Ethylenediamine	ES	Energy storage
EDA	Ethylene diamine; Energy decomposition analysis	ESA	Electrochemical surface area
EDAX	Manufacturer of energy dispersive X-ray hardware and software	ESEM	Environmental scanning electron microscope
EDBB	Ethylenediamine bisborane	et al.	<i>Et Alii</i> : and others
EDC	Energy distribution curve	ETA	Event tree analysis
edmimCl	2-ethyl-1,3-dimethyl-imidazolium ethylsulfate	etc.	<i>Et cetera</i> : and so on
EDS	Energy dispersive X-ray spectroscopy; Energy dispersive spectrum	E-TEK	Division of De Nora North America, Inc.
EDTA	Ethylenediamine tetraacetic acid	ETFE	Ethylene-tetrafluoroethylene
		ETFECS	Extended thin film electrocatalyst structures
		EtOH	Ethanol
		EU	European Union

eV	Electron volt	FLP	Frustrated Lewis pair
EVD	Extreme value distributions	FLUENT	Computer code for computational fluid dynamics
EVOH	Ethylene vinyl alcohol	FMEA	Failure modes and effects analysis
EVSE	Electric vehicle supply equipment	¹⁹ FNMR	¹⁹ Fluorine nuclear magnetic resonance
EW	Equivalent weight	FNR	Ferredoxin NADP+ oxidoreductase
EXAFS	Extended X-ray absorption fine structure analysis	FOM	Federated object model
F	Fluorine	FOM	Figure of merit
F	Faraday constant, the amount of electric charge in one mole of electrons (96,485.3383 coulomb/mole)	FPA	Fluoroalkyl phosphonic and phosphinic acids
F ⁻	Fluorine ion	fpi	Fins per inch
FA	Furfyl alcohol	fpm	Feet per minute
FANS	Filter analyzer neutron spectroscopy	FPS	Bis(4-fluorophenyl)sulfone; Fuel processing system
FAT	Fleet Analysis Toolkit; Factory acceptance test	FRP	Fiber-reinforced composite piping; Fiber-reinforced polymer; Full rate production
FBMR	Fluidized bed membrane reactor	FRR	Fluoride release rate
FC	Fuel cell	F-SPEEK	Fluorosulfonic acid of polyetheretherketone
FCB	Fuel cell bus	FSW	Friction stir welding
FCC	Face-centered cubic; Fuel Cell Catalyst; Fluid catalytic cracking	ft	Feet
FCEB	Fuel cell electric bus	FT	Fault tree
FCEV	Fuel cell electric vehicle	ft ²	Square feet
FC POWER	Fuel Cell Power Model	ft ³	Cubic feet
FCPP	Fuel cell power plant	FTA	Federal Transit Administration
FCS	Fuel cell system	FTA	Fault tree analysis
FCSMR	Forecourt steam methane reformer (ing)	FT-IR, FTIR	Fourier transform infrared
FCT	Fuel Cell Technologies	FTIR-ATR	Fourier transform infrared attenuated total reflection
FCTES ^{QA}	Fuel Cell Testing, Safety and Quality Assurance (an international effort to harmonize fuel cell testing procedures)	FTO	Fluorine-doped tin oxide
FCTT	Fuel Cell Technical Team	FTP, FTP-75	Federal Test Procedure
FCV	Fuel cell vehicle	FW	Formula weight
Fd	Ferredoxin	FW	Filament winding
Fe	Iron	FWHM	Full width at half maximum
FE	U.S. DOE Office of Fossil Energy	FY	Fiscal year
Fe ₂ O ₃	Ferric oxide	g	Gram; acceleration of gravity
FEA	Finite element analysis	G	Graphite
FEM	Finite element model	Ga	Gallium
FEP	Fluorinated ethylene propylene; Teflon [®]	GaAs	Gallium arsenic
FESEM	Field emission scanning electron microscope	GADDS	General area diffraction system
fg-ELAT	Fine gradient ELAT	gal	Gallon
FIB	Focused ion beam	GaP	Gallium phosphide
FISIPE	Fibras Acrilicas Portugese	GB	Gigabyte
FIT	Florida Institute of Technology	GC	Gas chromatograph; General computational
FLiNaK	LiF-NaF-KF eutectic salt	GC	Glassy, or vitreous carbon; a pure carbon that is amorphous (non-crystalline)
		g/cc	Grams per cubic centimeter
		GCLP	Grand-canonical linear programming

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GCMC	Grand Canonical Monte Carlo	GREET2	Greenhouse gases, Regulated Emissions and Energy use in Transportation model
GCMS	Gas chromatograph-mass spectroscopy	GRPE	Working Party on Pollution and Energy
GCNF	Graphitized carbon nano-fiber	g/s	Grams per second
GCNT	Graphitized carbon nanotubes	GTI	Gas Technology Institute
GCTool	Software package developed at ANL for analysis of fuel cells and other power systems	GTR	Global Technical Regulations
Gd	Gadolinium	GUI	Graphical user interface
GDC	Gadolinium-doped ceria	GV	Gasoline vehicle
GDE	Gas diffusion electrode	GW	An approximation permitting practical calculation of excitation energies in metals, semi-conductors and insulators
GDL	Gas diffusion layer	GWe, GW _e	Gigawatt(s) electric
GDM	Gas diffusion media	h	Hour(s)
GDS	Galvanodynamic scan	H	Hydrogen
Ge	Germanium	H ⁺	Proton
GES	Giner Electrochemical Systems, LLC	H ⁻	Hydride
GF	Glass fiber	H ₂	Diatomic hydrogen
GFC	Gas flow channel	H2A	Hydrogen Analysis project sponsored by DOE
GGA	Generalized gradient approximation	H ₂ BPYDC	2,2'-bipyridine-5,5'-dicarboxylic acid
GGE, gge	Gasoline gallon equivalent	H ₂ cat	Catechol, 1,2 dihydroxybenzene
GH ₂	Gaseous hydrogen	H ₂ -FCS	Stationary fuel cell system designs that co-produce hydrogen
GHG	Greenhouse gas	H ₂ (hfipbb)	4,4'-(hexafluoroisopropylidene)bis(benzoic acid)
GHSV	Gas hourly space velocity	H2-ICE, H ₂ ICE	Hydrogen internal combustion engine
GIS	Geographic information system	H ₂ Lib	Library of H ₂ component models in Simulink
GJ	Gigajoule(s)	H ₂ O	Water
g/kW	Gram(s) per kilowatt	H ₂ O ₂	Hydrogen peroxide
GLACD	Glancing angle co-deposition	H ₂ oba	4,4'-oxybis-benzoic acid
GLAD	Glancing angle deposition	H2QWG	DOE Hydrogen Quality Working Group
GLS	Gas-liquid separator	H ₂ S	Hydrogen sulfide
GLY	Glycerol	H ₂ SO ₄	Sulfuric acid
Glyme	Dimethoxyethane	H2V	Hydrogen vehicle
gm	Gram(s)	H ₃ BBC	1,3,5-tris(4'-carboxy[1,1'-biphenyl]-4-yl-)benzene
GM	General Motors	H ₃ BTB	4,4',4''-benzene-1,3,5-triyl-tribenzoic acid
gm/day	Gram(s) per day	H ₃ PO ₄	Phosphoric acid
g/min	Gram(s) per minute	HAADF	High-angle annular dark-field
GNF	Graphite nanofiber	HAADF-STEM	High angle annular dark field scanning transmission electron microscopy
GO	Graphene oxide	HAMMER	Hazardous Materials Management and Emergency Response
GODC	Graphene oxide derived carbon	HATCI	Hyundai-KIA America Technical Center Inc.
GOF	Graphene-oxide framework	HAVO	Hawaii Volcanoes National Park
GPa	Gigapascal(s)	HAZ	Heat affected zone
GPC	Gel permeation chromatography	HAZID	Hazard Identification Analysis
GPS	Global positioning system		
GPU	Gas permeation units		
GRC	Glass-reinforced concrete		
GREC	Graphite reinforced epoxy composite (IM6 continuously wound)		

HAZOP	Hazards and Operational Safety Analysis; Hazards and operability analysis	HGM	Hydrogen Generation Module
HB	Hydrazine borane	HGMs	Hollow glass microspheres
HBr	Hydrogen bromide	HGV	Hydrogen gaseous vehicle
HBTU	o-Benzotriazol-1-yl-N,N,N',N'-tetramethyluronium hexafluorophosphate	HHV	Higher heating value
HC	High concentration	HI	Hydrogen iodide, hydriodic acid
HCC	Hybrid cathode catalyst	HIA	Hydrogen-induced amorphization; Hydrogen Implementing Agreement
HCl, HCL	Hydrochloric acid; Hydrogen chloride	HIAD	Hydrogen Incidents and Accidents Database
HClO ₄	Perchloric acid	HIB	High-impedance buffer
HCN	Hydrogen coordination number	HIC	Hydrogen-induced cracking
HCNG	Hydrogen-compressed natural gas	HICE	Hydrogen internal combustion engine
HCO ₃ ⁻	Bicarbonate	HiPCO, HiPCo	High-pressure carbon monoxide
hcp	Hexagonal close-packing	HIPOC	Hydrogen Industry Panel on Codes
HC&S	Hawaiian Commercial and Sugar Company	HIx	Blend of hydrogen iodide, iodine, and water
HD	Deuterium hydride	HKUST	1 Cu ₃ (1,3,5-benzenetricarboxylate) ₂
HDF	Hydrogen dispensing facility	HLA	High level architecture
HDPE	High-density polyethylene	HMC	Hyundai Motor Company
HDS	Hydrogen desulfurization	HNEI	Hawaii Natural Energy Institute
HDSAM	Hydrogen Delivery Scenario Analysis Model	HNO ₃	Nitric acid
He	Helium	HOMO	Highest occupied molecular orbital
HE	Hydrogen embrittlement	HOPG	Highly-ordered pyrolytic graphite
HEMA	2-hydroxyethyl methacrylate	HOR	Hydrogen oxidation reaction
HEN	Heat exchange network	hp	Horsepower
HEPA	High efficiency particulate air filter	HP	High pressure
HER	Hydrogen evolution reaction	HPA	Heteropoly acid
HES	Hydrogen energy station	HPC	Highly porous carbon
HEV	Hybrid electric vehicle	HPIT	Hydrogen-powered industrial truck
HEX	Heat exchanger	HPLC	High performance liquid chromatography
Hf	Hafnium	HPPH	1,6-di(4-hydroxyl)phenylperfluorohexane
HF	Hydrogen Fueler	HPPS	<i>N,N</i> -diisopropylethylammonium 2,2-bis(<i>p</i> -hydroxyphenyl) pentafluoropropanesulfonate
HF	Hydrofluorhydric acid; Hydrogen fluoride; Hartree Fock	HPRD	Hydrogen pressure relief device
HFB	Hexafluorobenzene	HQS100	Hydroquinone sulfone
HFC	Hydrogen fuel cell	hr	Hour(s)
HFCTF	Hawaii Fuel Cell Test Facility	HRA	Home refueling appliance
HFCV	Hydrogen fuel cell vehicle	HRS	Hydrogen refueling stations
HFI	Hydrogen Fuel Initiative	HRT	Hydraulic retention time
HFP	Hexafluoropropylene	HRTEM	High-resolution transmission electron microscopy
HFP	1,1,1,3,3,3 hexafluoro-2-propanol	HRS	Hydrogen refueling stations
HFR	High-frequency resistance	HR-STEM	High resolution scanning transmission electron microscopy
HFS	Hydrogen fueling station	HRXRT	High-resolution X-ray tomography
HFSS	High-flux solar simulator	HS	Hydrogen sorption
HFV	Hydrogen-fueled vehicle	HSAC	High surface area carbon
HGEF	Hawaii Gateway Energy Center		

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HSC	Database name derived from the letters for enthalpy, entropy and heat capacity	HyTRANS	DOE's market simulation model for the transition to hydrogen vehicles
HSCC	Hydrogen Station Cost Calculator	Hz	Hertz
HSCoE	Hydrogen Sorption Center of Excellence	HZM	Hot zone module
HSDC	Hydrogen Secure Data Center	i	Current density (mA/cm ²)
HSE	High surface area electrode	I	Current
HSECoE	Hydrogen Storage Engineering Center of Excellence	I ₂	Diatomic iodine
HSMCoE	Hydrogen Storage Material Center of Excellence	IBAD	Ion beam assisted deposition
HSO ₄	Bisulfate anion	IBS	Ion beam sputtering
HSP	Hydrogen safety plan	IC	Internal combustion
HSRP	Hydrogen Safety Review Panel	ICC	International Code Council
HSSIM	Hydrogen Storage SIMulator	ICE	Internal combustion engine
HSU	Hydrogen separation unit	ICEV	Internal combustion engine vehicle
HT	High temperature	ICMS	Integrated ceramic membrane system
HTAC	Hydrogen and Fuel Cell Technical Advisory Committee	ICP	Inductively coupled plasma
HTFC	High-temperature fuel cell	ICPAE	Inductively coupled plasma atomic emission
HTFSA	Trifluomethylsulfonic acid	ICP-AES	Inductively coupled plasma atomic emission spectroscopy
HTGR	High-temperature gas-cooled reactor	ICP-MS	Inductively coupled plasma mass spectrometry
HTHX	High-temperature heat exchanger	ICP-OES	Inductively coupled plasma optical emission spectroscopy
HTM	High-temperature membrane	ICR	Interfacial contact resistance
HTM	Hydrogen transport membrane	ID	Inside diameter
HTMWG	High Temperature Membrane Working Group	i.e.	<i>id est</i> : that is
HTPEM	High-temperature polymer electrolyte membrane	IE	Intelligent Energy
HTWGS	High-temperature water-gas shift	IEA	International Energy Agency
HTXRD	High-temperature X-ray diffraction	IEA-HIA	International Energy Agency Hydrogen Implementing Agreement
HVAC	Heating, ventilation and cooling	IEC	International Electrotechnical Commission
HWCVD	Hot-wire chemical vapor deposition	IEC	Ion exchange capacity, milliequivalents of acid groups per gram of material
HWD	Hot wire deposition	IECV	Integrated end cap vessel
HWFET	Highway Fuel Economy Test	IEEE	Institute of Electrical and Electronics Engineers, Inc.
HX	Heat exchanger	IFC	International Fire Code
HyARC	Hydrogen Analysis Resource Center	IGBT	Insulated-gate bipolar transistor
Hydrofill™	GTI hydrogen dispenser filling control algorithm	IGCC	Integrated gasification combined cycle
HyDRA	Hydrogen Demand and Resource Analysis	IGCC-CMR	Integrated gasification combined cycle-catalytic membrane reactor
HyPro, HYPRO	Analysis tool	IGCC-MR	Integrated gasification combined cycle-membrane reactor
HyQRA	Hydrogen quantitative risk assessment	IGCC-PBR	Integrated gasification combined cycle-paladium-based reactor
HyS	Hybrid sulfur	IGT	Institute of Gas Technology
HYSYS®	Process simulation software by AspenTech, computer code for flowsheet analysis	IINS	Inelastic incoherent neutron scattering
HyTEC	Hydrogen Technology and Energy Curriculum	IIT	Illinois Institute of Technology
HyTEx	Hydrogen Technical Experimental (database)		

IL	Ionic liquid	JHQTF	Joint Hydrogen Quality Task Force (U.S. Fuel Cell Council)
In	Indium	JM	Johnson Matthey
In., in	Inch	JMFC	Johnson-Matthey Fuel Cells, Inc.
in ²	Square inch	JNAIST	Japanese National Institute of Advanced Industrial Science and Technology
INER	Institute of Nuclear Energy Research	JOBS FC	JOBS and economic impacts of Fuel Cells
INERI	International Nuclear Energy Research Initiative	JPL	Jet Propulsion Laboratory
InP	Indium phosphorus	JRC	Joint Research Centre
INS	Inelastic neutron scattering	J-V	Current density-voltage
I-O	Input-output	K	Sievert's constant, ml/[cm ² -min-atm ^{1/2}]
IOS	Intelligent Optical Systems, Inc.	K	Kelvin, absolute temperature
IP	Induction period	K	Potassium
IP	Intellectual property	kÅ	1000 angstroms
IPA	Isophthalate	KAERI	Korea Atomic Energy Research Institute
IPA	Isopropyl alcohol	KAIST	Korea Advanced Institute of Science and Technology
IPCC	Intergovernmental Panel on Climate Change	kA/m ²	Kilo-ampere(s) per square meter
IPCE	Incident photon conversion to electrons; Incident photon conversion efficiency	kb	Kilo-base pair, a unit of measurement used in genetics equal to 1,000 nucleotides
IPE	Integrated photovoltaic electrolysis	KBr	Potassium bromide
IPES	Inverse photoemission spectroscopy	kcal	Kilocalorie(s)
IPHE	International Partnership for the Hydrogen Economy	kcal/mol	Kilocalorie(s) per mole
IPNS	Intense Pulse Neutron Scattering Facility at Argonne National Laboratory	KeV	Kilo electron volt(s)
IQE	Internal quantum efficiency	kg	Kilogram(s)
IR	Infrared	kg/d	Kilogram(s) per day
iR	Internal resistance	kg/hr	Kilogram(s) per hour
Ir	Iridium	kg/m ³	Kilogram(s) per cubic meter
IRMOF	Isorecticular metal organic framework	KH	Potassium hydride
IrO _x	Iridium oxide	KHTC	Hydrotalcites
IRR	Internal rate of return	KHTC	Potassium-promoted hydrotalcite
IRRAS	Infrared reflection-absorption spectroscopy	kHz	Kilohertz
ISIS	World's leading pulsed neutron and muon source located at the UK Rutherford Appleton Laboratory near Oxford.	KIA	Kia Motor Company
ISO	International Organization for Standardization	KIC	Key industrial collaborators
ISO TC197	International Standards Organization Technical Committee	K _{IH}	Fracture toughness measured in hydrogen gas
ISS	Ion scattering spectroscopy	kJ	Kilojoule(s)
ITM	Ion transport membrane	K _{JIC}	Fracture toughness
ITO	Indium tin oxide	kJ/mol	Kilojoule(s) per mole
ITP	Indium tin phosphate	km	Kilometer(s)
IV	Current-voltage	KMC	Kinetic Monte Carlo; Kilauea Military Camp; Kia Motors Corporation
J	Current	KOH	Potassium hydroxide
J	Joule(s)	kPa	Kilopascal(s)
		kph	Kilometer(s) per hour
		ksi	1,000 pound-force per square inch

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kT/y	Kiloton(s) per year	LHC	Light-harvesting chlorophyll
Kth, K_{th}	Fracture toughness threshold	LHS	Lawrence Hall of Science
K_{TH}	Hydrogen-assisted crack growth threshold	LHSV	Liquid hourly space velocity, h^{-1}
kVA	Kilovolt-amp (units of apparent power)	LHV	Lower heating value
kW	Kilowatt(s)	Li	Lithium
kWe, kW_e	Kilowatt(s) electric	Li_3N	Lithium nitride
kWh	Kilowatt-hour(s)	Li-AB	Lithium amidoborane, $Li-NH_2-BH_3$
kWh/kg	Kilowatt-hour(s) per kilogram	$LiBH_4$	Lithium borohydride
kWh/L	Kilowatt-hour(s) per liter	LIBS	Laser-induced breakdown spectroscopy
kW/kg	Kilowatt(s) per kilogram	LiH	Lithium hydride
kWt	Kilowatt(s) thermal	LLC	Limited Liability Company
L, l	Liter(s)	LLC	Lessons Learned Corner
La	Lanthanum	LLNL	Lawrence Livermore National Laboratory
LAGP	Lithium aluminum germanium phosphate	L/min, l/min	Liter(s) per minute
LAH	Lithium aluminum hydride ($LiAlH_4$)	LMWO	Lanthanum molybdenum tungsten oxide (<i>e.g.</i> , $La_2Mo_{1.8}W_{0.2}O_{9-x}$)
λ	Lambda, hydration number	LN_2	Liquid nitrogen
LAMH	Lithium amide and magnesium hydride	LNG	Liquefied natural gas
LAMOX	Lanthanum molybdenum oxide (<i>e.g.</i> , $La_2Mo_2O_9$)	LOC	Liquid organic carrier
LANL	Los Alamos National Laboratory	LOHC	Liquid organic hydrogen carrier
LAO	Lanthanum-modified alumina	LP	Lattice parameter
LAS	Large aperture scatterometry	LPG	Liquefied petroleum gas
lb	Pound(s)	LPM	Liters per minute
LBM	Lattice Boltzmann method	LPR	Liquid-phase reforming
lbmol	Pound-mole(s)	LQ*	Dehydrogenated liquid carrier
LBL	Lawrence Berkeley National Laboratory	LQ*H2	Hydrogenated liquid carrier
LC	Liquid carrier; Low concentration	LRIP	Low rate initial production
LCA	Life cycle assessment; Life-cycle analysis	LRS	Laser raman spectroscopy
LCC	Life cycle cost	LS	Larger Stations
LCC	$La_{0.7}Ca_{0.3}CrO_{3-\delta}$	LSAC	Low surface area carbon
LCH_2	Hydrogenated liquid carrier; Compressed hydrogen produced from liquid hydrogen	LSC	Lanthanum strontium cobalt oxide, (La, Sr) CoO_3 , strontium-doped lanthanum cobaltite, $La_{0.8}Sr_{0.2}CoO_{3+\delta}$
LCHPP	Low Cost Hydrogen Production Platform (DOE Program Title)	LSCF	Lanthanum strontium cobalt iron oxide, (La, Sr)(Co, Fe) O_3
LCMS	Liquid chromatography-mass spectroscopy	LSCF7328	La-Sr-Cu-Fe-O
LCOE	Levelized cost of electricity	LSCM	Lanthanum strontium chromium manganese oxide, (La, Sr)(Cr, Mn) O_3
L/D	Length to diameter ratio	LSCr	Lanthanum strontium chromium oxide, (La, Sr) CrO_3
LDV	Light-duty vehicle	LSM	Lanthanum strontium manganese
LED	Light emitting diode	LSMO	Lanthanum strontium manganese oxide, (La, Sr) MnO_3 , strontium-doped lanthanum manganite, $La_{0.8}Sr_{0.2}MnO_{3+\delta}$
LEED	Low-energy electron diffraction	LST	Lanthanum strontium titanium oxide, (La, Sr) TiO_3
LEL	Lower explosion limit		
LFG	Landfill gas		
LFL	Lower flammability limit		
L/h, l/h	Liter(s) per hour		
LH2, LH_2	Liquid hydrogen		

LSV	Lanthanum strontium vanadate; Linear sweep voltammetry	MBMS	Molecular beam mass spectrometry
LT	Low-temperature	M-BOP	Mechanical balance of plant
LTDMS	Laser induced thermal desorption mass spectrometry	MBRC	Miles between roadcall
LUMO	Lowest unoccupied molecular orbital	MBWR	Modified Benedict Webb Rubin
m	Meter(s)	MC	Monte Carlo
M	Mole, molar	MC	Methyl cellulose
M	Million	mC ²	Multi-component composite (membrane)
m ²	Square meter(s)	MCB	Marine Corps Base
m ² /g	Square meter(s) per gram	mC-cm ⁻²	MilliCoulomb(s) per square centimeter
m ² /s	Square meter(s) per second	MCEL	Millenium Cell, Inc.
m ³	Cubic meter(s)	MCFC	Molten carbonate fuel cell
M31	Arkema's first-generation membrane candidate	mCHP	Micro-combined heat and power
M41	Arkema's second-generation membrane candidate	μc-Si	Microcrystalline silicon
M43	Arkema's third-generation membrane candidate	MDES	Methyl-diethoxy silane
M51, M52, M53	Arkema's membanes incorporating phosphonic acid	mdip	5,5'-methylene-di-isophthalate
M70	Arkema's fourth-generation membrane candidate	MEA	Membrane electrode assembly
MA	Mass activity; methyl acrylate	MeAB	Methylamine borane
MA3T	Market Acceptance of Advanced Automotive Technologies	MEAM	Modified embedded atom method
μA	Micro ampere(s)	MEC	Microbial electrolysis cell; Minimum explosive concentration
mA	MilliAmps (s)	MeCN	Acetonitrile
MA	Mass activity	MEIC	Mixed electronic and ionic conducting (membranes)
M-AB	Metal ammonia-borane	MEMS	Micro-electro-mechanical systems
MAB, M-AB	Metal amidoboranes	MeOH	Methanol
μA/cm ²	Micro ampere(s) per square centimeter	meq	Milliequivalents
mA/cm ²	Milliamp(s) per square centimeter	meq/g	Milliequivalents/gram
MARKAL	Market Allocation Model - A generic, multi-sector energy model developed by the Energy Technology Systems Analysis Program of the International Energy Agency	MeV	Mega electron volt
MAS	Magic angle spinning	mf	Mass fraction
MAS ¹¹ B-NMR	Magic angle spinning boron-11 nuclear magnetic resonance spectroscopy	Mg	Megagram(s)
MAS-NMR	Magic angle spinning nuclear magnetic resonance	μg	Microgram(s)
MATI	Modular Adsorption Tank Insert	mg	Milligram(s)
MAWP	Maximum allowable working pressure	MgCl ₂	Magnesium chloride
MB	Megabyte	mg/cm ²	Milligram(s) per square centimeter
MBE	Molecular beam epitaxy	MgH ₂	Magnesium hydride
		MgH ₂ @C	MgH ₂ incorporated in carbon scaffold
		MgO	Magnesium oxide
		Mg(OH) ₂	Magnesium hydroxide
		mgPt/cm ²	Milligram (s) of platinum per square centimeter
		MH, M-H	Metal hydride
		MHC	Metal hydride-based compressor
		MHCoE	Metal Hydride Center of Excellence
		MHE	Material handling equipment
		MHz	Megahertz

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mi	Mile(s)	MPHI	Methylperhydroindole
μCHP	Micro-combined heat and power	MPL	Microporous layer
μCHX	Microscale combustor/heat exchanger	MPMC	Massively Parallel Monte Carlo
MIE	Minimum ignition energy	mpy	Mils per year
MIEC	Mixed ionic and electronic conduction	MQMAS	Multiple quantum magic angle spinning
mi/kg	Mile(s) per kilogram	MR	Membrane reactor
mil	Millimeter(s)	MRCAT	Materials Research Collaborative Access Team
min	Minute(s)	MREC	Microbial reverse-electrodialysis electrolysis cell
MIT	Massachusetts Institute of Technology	MRI	Magnetic resonance imaging
MiTi®	Mohawk Innovative Technologies Inc.	MRL	Manufacturing readiness level
MJ	Megajoule(s)	ms	Millisecond(s)
mL, ml	Milliliter(s)	MS	Mass spectroscopy; Mass spectrometry; More Stations
ML	Monolayer	MSAC	Mid-range carbon support; Medium surface area carbon
μCHP	Micro-combined heat and power	mS/cm	Milli-Siemen(s) per centimeter
μm	Micrometer(s); micron(s)	MS-H ₂	Hydrogen mass spectrometry
μM	Micromolar	MSM	Macro-System Model
mM	Millimolar	MSR	Membrane steam reformer
mm	Millimeter(s)	MSRI	Materials and Systems Research, Inc.
MMBtu	Million British thermal units	MTA	Metric tonne per annum; Mass Transportation Agency
MM-FSW	Multi-pass, multi-layer friction stir welding	MTBF	Mean time between failure
MMOF	Microporous metal-organic framework	MTBR	Mean time between repairs
mmol	Millimole(s)	M/TC	Metal-doped templated carbon
μmol	Micromole(s)	M-TCPP	M = Fe, Mn, Co, Ni, Cu, Zn, H ₂ , tetrakis(4-carboxyphenyl)porphyrin
MMSCFD	Million standard cubic feet/day	mtorr	Millitorr
MMT	Million metric tonnes	μV	Microvolt(s)
Mn	Manganese	mV	Millivolt(s)
Mn ₂ O ₃	Manganese oxide	MV	Methyl viologen
M-N-H	Amide/imide	mW	Milliwatt(s)
MnO	Manganese oxide	MW	Megawatt(s)
mΩ	Milli-ohm(s)	MW	Molecular weight
MΩ	Mega-ohm(s)	mW/cm ²	Milliwatt(s) per square centimeter
mΩ/cm ²	Milli-ohm(s) per square centimeter	MWCNT	Multiple-wall carbon nanotube
μΩ-cm ²	Micro-ohm(s) - square centimeter	MWe	Megawatt(s) electric
Mo	Molybdenum	MWh	Megawatt-hour(s)
MO	Molecular orbital; metal oxide	MWNT	Multi-wall carbon nanotube
MOF	Metal-organic framework	MWOE	Midwest Optoelectronics, LLC
mol	Mole(s)	MWth	Megawatt(s) thermal
mol%	Mole percent	MYPP	Multi-Year Program Plan (the Fuel Cell Technologies Program's Multi-Year Research, Development and Demonstration Plan)
mol/min	Mole(s) per minute		
MoPc	Molybdenum phthalocyanine		
MOR	Methanol oxidation reaction		
MPa	Megapascal (s)		
MPG, mpg	Mile(s) per gallon		
MPGGE	Miles per gasoline gallon equivalent		
mph	Mile(s) per hour		

MYRDD, MYRD&DP	Multi-Year Research, Development and Demonstration Plan	NEED	National Energy Education Development Project
N	Normal (e.g., 1N H ₃ PO ₄ is 1 normal solution of phosphoric acid)	NEF	N-ethylformamide
N	Nitrogen atom	NEMS	National Energy Modeling System
N	Newton (unit of force)	NEPA	National Environmental Policy Act
N112	Nafion [®] 1100 equivalent weight, 2 millimeter thick membrane	NETL	National Energy Technology Laboratory
N ₂	Diatomic nitrogen	NEU	Northeastern University
N ₂ O	Nitrous oxide	NEXAFS	Near edge X-ray absorption fine structure
Na	Sodium	NFCBP	National Fuel Cell Bus Program
NA	North American	NFCRC	National Fuel Cell Research Center
Na ₂ S	Sodium sulfide	NFM	Nanoporous framework material
Na ₃ AlH ₆	Trisodium hexahydroaluminate	Nfn-Pt/C	Nafion [®] -loaded Pt/C
NaAlH ₄	Sodium aluminum hydride; Sodium tetrahydroaluminate; Sodium alanate	NFPA	National Fire Protection Association
NaBH ₄	Sodium borohydride	ng	Nanogram
NaBO ₂	Sodium metaborate	NG	Natural gas
NACE	National Association of Corrosion Engineers	NGCC	Natural gas combined cycle
NaCl	Sodium chloride	NGV	Natural gas vehicle
NACS	North American Catalysis Society	NH ₃	Ammonia
NADH	(reduced) Nicotinamide adenine dinucleotide	NHA	National Hydrogen Association
NADP	Nicotinamide adenine dinucleotide phosphate	NHE	Normal hydrogen electrode
NADPH	Nicotinamide adenine dinucleotide phosphate	NHFC4	National Hydrogen and Fuel Cells Codes and Standards Coordinating Committee
Nafion [®]	Registered Trademark of E.I. DuPont de Nemours	NHI	Nuclear Hydrogen Initiative
NaH	Sodium hydride	NHTSA	National Highway Traffic Safety Administration of the U.S. Department of Transportation
NA NG	North American natural gas	Ni	Nickel
NaOH	Sodium hydroxide	NICC	Natural gas Infrastructure Component Cost model
NAS	National Academy of Sciences	NILS	Normal interstitial lattice sites
NASA	National Aeronautics and Space Administration	NiMH	Nickel metal hydride
Nb	Niobium	NIR	Near infra-red
N/cm ²	Newton(s) per square centimeter	NIST	National Institute of Standards and Technology
Ncc	Normal cubic centimeters	NL	Normal liter(s)
NCNR	NIST Center for Neutron Research	NLDFT	Non-local density functional theory
ND	Not determined at this time	nm	Nanometer(s)
NDC	New delivery concept, Naphthalene-2,6-dicarboxylate	NM	Noble metal
nDDB	N-dodecyl benzene	Nm ³	Normal cubic meter(s)
NDE	Non-destructive examination	NMHC	Non-methane hydrocarbons
NE	U.S. DOE Office of Nuclear Energy, Science and Technology	nmol	Nanomole(s)
NEB	Nudged elastic band	NMP	N-methylpyrrolidone
NEC	National Electrical Code	NMR	Nuclear magnetic resonance
		NMSU	New Mexico State University
		NMT	New Mexico Tech
		NNA	Non-North American

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NNA NG	Non-North American natural gas	OCP	Open circuit potential
NNIF	NIST neutron imaging facility	OCSD	Orange County Sanitation District
NNSA	National Nuclear Security Administration	OCV	Open-circuit voltage
NMOC	Non-methane organic carbons	o.d.,OD	Outer diameter
NO ₂	Nitric oxide	ODA	Oxygenated form of diamine
NO _x , NO _x	Oxides of nitrogen	ODE	Ordinary differential equation
NOA	Norland Optical Adhesive	OEC	Oxygen evolving complex
nOB	N-octyl benzene	OEM	Original equipment manufacturer
NP	Nanoparticle	OER	Oxygen evolution reaction
NPB	Neopentyl benzene	OGMC	Ordered graphitic mesoporous carbon
NPC	Nanoporous carbon; Normalized photocurrent	OH ⁻	Hydroxyl radical
NPGM	Non-precious metal group	O&M	Operation and maintenance
NPMC	Non-precious metal catalyst	OMC	Ordered mesoporous carbon
NPD	Neutron powder diffraction	ONR	Office of Naval Research
NPDF	Neutron powder diffraction	ORNL	Oak Ridge National Laboratory
NPM	Nanostructured polymeric materials	ORNL-HTML	Oak Ridge National Laboratory High Temperature Materials Laboratory
NPM	Non-precious metal	ORR	Oxygen reduction reaction
NPPD	n-phenyl-phenylenediamine	OSC	Oxygen storage capability
NPS	National Park Service	OSHA	Occupational Safety and Health Administration
NPT	Normal pressure and temperature	OSM	Optical scatterfield microscopy
NPV	Net present value	o-SWNH	Oxidized single-walled nanohorn
NR	Nanorod	OSU	Ohio State University
NR ₃	Tertiary amine	OSU	Oregon State University (Microproducts Breakthrough Institute)
NRC	National Research Council	OTM	Oxygen transport membrane
NREL	National Renewable Energy Laboratory	P	Phosphorus
NRELFAT	NREL Fleet Analysis Toolkit	P	Pressure
NSF	National Science Foundation	Pa	Pascal(s)
NSTF	Nano-structured thin-film	PA	Phenylacetylene; Polyamide
NSTFC	Nano-structured thin film catalyst	PAA	Poly(acrylic acid)
NT	Nanotube	PADD	Petroleum Administration for Defense District
NTCNA	Nissan Technical Center, North America	PAES	Poly(arylene-ether-sulfone)
NTE	Negative thermal-expansion	PAFC	Phosphoric acid fuel cell
NV	Neutron vibrational	PAN	Peroxyacetyl nitrate; Polyacrylonitrile
NVS	Neutron vibrational spectroscopy	PANI	Polyaniline
NWM	“Natural Water Management”, UTC Power’s system and cell stack design which utilizes evaporative cooling in the cell stack assembly	PAN-MA	Polyacrylonitrile with methyl acrylate
NYSERDA	New York State Energy Research and Development Authority	PAN-VA	Polyacrylonitrile with vinyl acetate
NZVI	Nano zerovalent iron	PA/PBI	Phosphoric-acid-doped polybenzimidazole
Ω	Ohm(s)	PAR	Photosynthetically-active radiation
Ωcm ²	Ohm(s) - square centimeter	PAS	Photoactive semiconductor; Photo acoustic
O	Oxygen	Pb	Lead
O ₂	Diatomic oxygen	PB	Polyborazylene
O/C	Oxygen-to-carbon ratio		

PBI	Polybenzimidazole	PEGS	Prototype electrostatic ground state
PBPDSA	poly(biphenylene disulfonic acid)	PEI	Polyetherimide; Polyethylene imine
P-C	Pressure-composition	PEKK	Poly (ether ketone ketone)
PC	Polycarbonate	PEM	Proton exchange membrane; Polymer electrolyte membrane
PCA	Pyrenecarboxylic acid	PEMFC	Polymer electrolyte membrane fuel cell
PCE	Perchloroethylene	PEMFC	Proton exchange membrane fuel cell
PCF	Polycarbonate film	PEN	Polyethylene naphthalate
PCHD	Poly(cyclohexadiene)	PEO	Poly(ethylene oxide)
PCI	Pressure-composition isotherm	PES	Polyether sulfone
PCL	Polycaprolactone	PES	Proton Energy Systems, Inc.
PCM	Power control module	PES	Polyethersulfone
PCN	Porous coordination network	PET	Polyethylene terephthalate
P-C-P	Phosphorus-carbon-phosphorus	PetF1	<i>Synechocystis</i> host ferredoxin
PCR	Polymerase chain reaction	PEV	Plug-in electric vehicle
PCS	Power conditioning system	PF	Phenolic
PCT, P-C-T	Pressure-concentration-temperature	PFA	Perfluoroalkoxy (a type of fluoropolymer)
PCTFE	Polychlorotrifluoroethylene	PFA	Polyfurfuryl alcohol
Pd	Palladium	PFAC	PFA-derived carbon
PDA	Phenyldiacetylene	PFAE	Perfluoroalkylether
PdAg	Palladium-silver alloy	PFC	Polymer electrolyte membrane fuel cell
Pd-ACF	Pd-modified activated carbon fibers	PFCS	Poly-generative fuel cell systems
Pd-CR	Palladium-based chemical resistor	PFD	Process flow diagram
PdCu, Pd-Cu	Palladium-copper alloy	PFGB	Perfluorinated guanidine base
PdCuTM	Palladium copper transition metal	PFG-NMR	Pulse field gradient nuclear magnetic resonance
PDF	Probability density function; Pair distribution function	PFGSE	Pulse field gradient spin echo
PdHg/CF	Carbon foam doped with palladium-mercury compound	PFGSE NMR	Pulsed field gradient spin echo nuclear magnetic resonance
PDI	Polydispersity index	PFIA	Perfluoro imide acid
Pd-MIS	Palladium-based metal-insulator-semiconductor	PFPO	Perfluorinated propylene oxide
PDMS	Polydimethylsiloxane	PFPO-PSS	Poly(perfluoropropylene oxide)-b-poly(styrene sulfonate)
PDS	Potentiodynamic scan	PFSA	Perfluorinated sulfonic acid, perfluorosulfonic acid, poly(fluorosulfonic acid)
PDU	Process development unit	PFSI	Perfluorosulfonate ionomer
PE	Polyelectrolyte; Polyethylene	PFSHQ	2-(5-fluorosulfonyl-3-oxaocetafluoropentyl)-1,4-dihydroxy-benzene
PEC	Photoelectrochemical; Photoelectrocatalyst; Photoelectrochemical cell	PG	Propylene glycol
PECH	Polyepichlorohydrin	PGAA	Prompt-gamma activation analysis
PECVD	Plasma-enhanced chemical vapor deposition	PGE	Platinum group element
PED	Pulsed electrodeposition	PGM	Precious group metal; Platinum-group metal
PEEK	Polyether ether ether ketone	PGSE	Pulsed-field gradient spin-echo
PEFC	Polymer electrolyte fuel cell	PGV	Puna Geothermal Ventures
PEFC	Proton exchange fuel cell	pH	Power of the hydronium ion
PEG	Polyethylene glycol	<i>p</i> -H ₂	Para-hydrogen
PEGMEMA	Monomethoxypoly(ethyleneglycol) methacrylate		

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Ph ₃ SnCl	Triphenyltin chloride	PPI	Pore(s) per inch
Ph ₃ SnSnPh ₃	Hexaphenyldistannane	ppm, PPM	Part(s) per million
PHA	Process hazard analysis; Preliminary hazard analysis	ppmv	Part(s) per million by volume
PHEC	Perhydro-ethylcarbazole	ppmw	Part(s) per million by weight
PHEV	Plug-in hybrid electric vehicle	PPN	Porous polymer network
PHI	Perhydro-indolizidine	PPO	Phenyl phosphine oxide
PHIP	Para-hydrogen induced polarization	PPOR	Metalloporphyrin porous organic polymer
PHMI	Perhydro-methylindole	P-POSS	Phosphonic acid polyhedral oligomeric silsesquioxane
PhOH	Phenol	PPS	Polyphenylene sulfide
PI	Principal investigator	PPSA	Poly (p-phenylene sulfonic acid)
PI	Polyimide	PPSA	Partial pressure swing adsorption
P&ID	Piping and instrumentation diagram; Process and instrumentation diagram	PPSU	Polyphenylsulfone
PIL, pIL	Protic ionic liquid	PPy	Polypyrrole
PIM, pIM	Protic ionic membrane	Pr	Praseodymium
pK _a	Acid dissociation constant	PR	Pressure ratio
PLC	Programmable logic controller	PRA	Probabilistic risk assessment
PLLA	Poly-L-lactic acid	PRD	Pressure relief device
PLP	prepared Lewis pair	PrOx	Preferential oxidation
PLRS	Planar laser Raleigh scatter	PRSV	Peng-Robinson Stryjek-Vera
PLS	Polymer-layered silicate	PS	Proton sponge (bis- (dimethylamino) naphthalene)
PM	Precious metal such as platinum	PS	Polysiloxane
PM	Particulate matter	PSA	Pressure swing adsorption, adsorber
PMG	Glycidyl methacrylate-type copolymer	PSAT	Powertrain Systems Analysis Toolkit, a vehicle simulation software package developed at Argonne National Laboratory
PMMA	Poly(methyl methacrylate)		
PND	Polymerized nitrogen donor	PSD	Particle size distribution, pore size distribution
PNNL	Pacific Northwest National Laboratory	PSEPVE	Perfluoro (4-methyl-3,6-dioxaoct-7-ene) sulfonyl fluoride
pO ₂	Oxygen partial pressure	PSf	Poly(arylene ether sulfone)
POC	Proof of concept	psi, PSI	Pound(s) per square inch
POCOP	<i>P,P</i> -bis(1,1-dimethylethyl)-3-[[bis(1,1-dimethylethyl)phosphino]oxy]phenyl ester	PSI	Photosystem I
POF	Polymeric-organic framework; Porous organic framework	psia	Pound(s) per square inch absolute
POM	Polyoxometallate	psid	Pound(s) per square inch differential
POP	Porous organic polymers	psig, PSIG	Pound(s) per square inch gauge
POSS	Polyhedral oligomeric silsesquioxane	PSOFC	Planar solid oxide fuel cell
POX	Partial oxidation	PSS	Porous stainless steel; Potentiostatic scan
PP	Polyphosphazene; Polypropylene; Poly(phenylene)	PSU	Polysulfone
PPA	Polyphosphoric acid; Polyphthalamide	PSU	Pennsylvania State University
ppb	Part(s) per billion	Pt	Platinum
ppbv	Part(s) per billion by volume	PT	Phosphazene trimer
PPDSA	Poly (p-phenylene disulfonic acid)	P-T	Pressure-temperature
PPE	Porous polyethylene	Pt ₃ Co	Platinum-cobalt alloy
PPI	Plug Power, Inc.	Pt ₃ Fe	Platinum-iron alloy

Pt ₃ Ni	Platinum-nickel alloy	QRA	Quantitative risk assessment
PTA	Phosphotungstic acid	Qst	Isosteric heats of adsorption
Pt/AC/BC/IRMOF-8	Isorecticular metal organic framework (MOF) doped with platinum supported on activated carbon, and further coupled to MOF with a bridging compound	R	Universal or ideal gas constant, 8.314472 J · K ⁻¹ · mol ⁻¹
Pt/AX-21	Pt-doped microporous carbon AX-21	RAMAN	A spectroscopic technique
Pt/C	Platinum/carbon	RAS	Russian Academy of Sciences
PTC	Production tax credit	RBS	Rutherford back scattering
PTFE	Teflon [®] – poly-tetrafluoroethylene	RC	Resistance-capacitance; Research cluster
Pt-FePO	Platinum iron phosphate	RCD	Rated current density
PTM	Proton transport membrane	RCS	Regulations codes and standards
PtML	Platinum monolayer	Rct	Charge transfer resistance
Pt-MM	Platinum group mixed metal	RCWA	Rigorous couples waveguide analysis
Pt-NH	Platinum decorated carbon nano-horns	R&D	Research and development
PtO	Platinum oxide	RD&D, R,D&D	Research, development & demonstration
PtO ₂	Platinum dioxide	RDE	Rotating disk electrode
PtRu	Platinum ruthenium	Re	Rhenium
Pt-SWNH	Platinum decorated single-walled nanohorns	ReaxFF	Reactive force field large-scale molecular dynamic calculations
Pt-TaPO	Platinum tantalum phosphate	REC	Renewable energy credit
PTTPP	Poly-tetrakis(3,5-dithiophen-2-ylphenyl)-porphyrin	RED	Reverse electro dialysis
PTW	Pump to wheels	REWP	Renewable Energy Working Party
PV	Photovoltaic; Present value	Rf	Generic fluoroalkyl group
PVA	Polyvinyl alcohol	RF, rf	Radio frequency
PVC	Polyvinyl chloride	RFC	Regenerative fuel cell
PVD	Physical vapor deposition	RFP	Request for proposals
PVDC	Poly-vinylidene chloride	RFT	Reactive flow-through
PVDF	Polyvinylidene fluoride	RGA	Residual gas analyzer (analysis)
PVP	Polyvinylpyrrolidone	Rh	Rhodium
PVPP	Polyvinyl pyridinium phosphate	RH	Relative humidity
PVT, P-V-T	Pressure-Volume-Temperature	RHE	Reference hydrogen electrode; Reversible hydrogen electrode
PXRD	Powder X-ray diffraction	RHLC	Relative humidity/load cycle test
PyC	4-pyrazole carboxylate	ρ_a	Apparent density of activated carbon
PzDC	2,8-pyrazabole dicarboxylate	\tilde{n}_{ad,H_2}	Adsorbate hydrogen density in micropores
Q	Neutron momentum transfer	RIXS	Resonant inelastic X-ray scattering spectra
Q1, Q2, Q3, Q4	Quarters of the fiscal year	RMS	Root mean square
QC	Quality control	RNA	Ribo nucleic acid
QCM	Quartz crystal microbalance	RNG	Renewable natural gas
QE	Quantum efficiency	ROI	Return on investment
QENS	Quasielastic neutron scattering	ROM	Rough order of magnitude
QLRA	Qualitative risk analysis	ROMP	Ring-opening metathesis polymerization
QMC	Quantum Monte Carlo	ROW	Right of way
QNS	Quasielastic neutron scattering	RPC	Ruthenium-polypridyl complex
		RPI	Rensselaer Polytechnic Institute
		rpm	Revolution(s) per minute

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RPN	Risk priority number	SD	Standard deviation; System dynamics
RPS	Renewable portfolio standard	SDAPP	Sulfonated Diels-Alder polyphenylene
RPSA	Rapic pressure swing adsorption	SDAPPe	Sulfonated Diels-Alder polyphenylene ether
RRDE	Rotating ring disc electrode	SDC	Samarium-doped ceria
RSOFC	Reversible solid oxide fuel cell	sDCDPS	3,3'-disulfonate-4,4'-dichlorodiphenylsulfone
RT	Room temperature	SDE	SO ₂ -depolarized electrolyzer
RTIL	Room temperature ionic liquid	SDO	Standards development organization
RTO	Ruthenium-titanium oxide	Se	Selenium
Ru	Ruthenium	SE	Secondary electron; spectroscopic ellipsometry
s	Second(s)	sec	Second(s)
S	Siemen(s)	SECA	Solid State Energy Conversion Alliance
S	Sulfur	SECM	Scanning electrochemical microscope
-S	Sulfur-deprived	SEM	Scanning electron microscopy; Scanning electron microscope
SA	Specific amperage	SEOS	Simple equation of state
SA	Surface area	SERA	Scenario Evaluation, Regionalization and Analysis
SA	Sulfur-ammonia thermochemical water-splitting cycle; System Architect	SERC	Schatz Energy Research Center
SAE	SAE International, originally known as the Society of Automotive Engineers	SET	Surface energy treatment
SAFC	Solid acid fuel cell	SF	Safety factor; Polystyrene-b-PFPO
SAH	Sodium aluminum hydride	SF ₆	Sulfur hexafluoride
SAM	Scanning Auger microscopy	SFA	Sulfonic acid
SAMPE	Society for the Advancement of Material and Process Engineering	SFC2	SrFeCo _{0.5} O _x
SANS	Small angle neutron scattering	SFM	Sr ₂ Fe _{1.5} Mo _{0.5} O _{6.8}
SAS	Styrene-acrylonitrile-vinylsulfate	SFT	Sr-Fe-Ti oxide
SASSP	Solvent assisted solid state processing	SFTI	Sr _{0.1} Fe _{0.9} Ti _{0.10} O _x
SAXS	Small angle X-ray scattering	SG	Shale gas
SBAB	Sec-butylamineborane	SGD	Spontaneous galvanic displacement; System gravimetric density
S _{BET}	BET specific surface area	SHE	Standard hydrogen electrode
SBH	Sodium borohydride	Si	Silicon
SBIR	Small Business Innovation Research	S-I	Sulfur-iodine
Sc	Scandium	SI	Sulfur-iodine cycle; Spectrum image
S/C	Steam to carbon ratio	Si ³ N ⁴	Silicon nitride
SCC	Stress corrosion cracking	SiC	Silicon carbide
sccm, SCCM	Standard cubic centimeter(s) per minute	SiCN	Silicon carbonitride
SCE	Saturated calomel electrode	SIMS	Secondary ion emission spectroscopy
SCF, scf	Standard cubic feet; Supercritical fluid	Si-NS	Silica nanosprings
scfd	Standard cubic feet per day	SiO ₂	Silicon dioxide
SCFH, scfh	Standard cubic feet per hour	SIU	Southern Illinois University
SCFM	Standard cubic feet per minute	sL	Standard liter (0°C, 1 atm)
S/cm	Siemen(s) per centimeter	slpm, slm, sL/min	Standard liter(s) per minute
SCOF	Single cell with open flowfield	SMART	Specific, measurable, attainable, relevant, timely
SCR	Selective catalytic reduction; Semi-conductor rectifier		
ScSZ	Scandia-stabilized zirconia		

SMR	Steam methane reformer; Steam methane reforming	SR	Steam reformer; Steam reforming; Salinity ratio; Stoichiometric ratio
SMR-ECM	Steam methane reformer with electrochemical purifier	SRNL	Savannah River National Laboratory
SMR-PSA	Steam methane reformer with pressure swing adsorption	SrO	Strontium oxide
SMT	Single-molecule trap	SrTiO ₃	Strontium titanate
Sn	Tin	SS	Stainless steel
SNG	Substitute natural gas	SSA	Specific surface area
SNL	Sandia National Laboratories	SSAWG	Storage System Analysis Working Group
SNLL	Sandia National Laboratory Livermore	SSC	Short side-chain; Structure, system, and component
SNR	Signal-to-noise ratio	SSNMR	Solid-state nuclear magnetic resonance
SNS	Spallation neutron source	SSRL	Stanford Synchrotron Radiation Laboratory
SNTT	Spiral notch torsion test	SSWAG	Storage System Working Analysis Group
SLAC	Stanford Linear Accelerator Center	STEM	Scanning transmission electron microscopy
SLPH	Standard liter(s) per hour	STEM	Science, technology, engineering, and mathematics
SLPM	Standards liter(s) per minute	STH	Solar-to-hydrogen
SLT	Strontium-doped lanthanum titanate	STM	Scanning tunneling microscopy
SnO	Tin oxide	STMBMS	Simultaneous thermogravimetric modulated beam mass spectrometer
SnO ₂	Tin oxide	STP	Standard temperature and pressure
SO ₂	Sulfur dioxide	STS	Scanning tunneling spectroscopy
SO ₃	Sulfur trioxide	STTP	Shared Technology Transfer Project
SOC	State-of-charge	STTR	Small Business Technology Transfer
SOEC	Solid oxide electrolysis cell; Solid oxide electrolyzer cell	S _u	Ultimate tensile strength
SOFC	Solid oxide fuel cell	SU/SD	Start-up and shut-down
SOFEC	Solid oxide fuel-assisted electrolysis cell	SUNY-ESF	State University New York Environmental Science Forestry
SOM	Solid-oxide oxygen-ion-conducting membrane	SV	Space velocity
SORFC	Solid oxide regenerative fuel cell	SVD	System volumetric density
SOTA	State of the art	SW	Square wave
SOW	Statement of work	SWCNH	Single-wall carbon nanohorn
SOx	Oxides of sulfur	SWCNT	Single-walled carbon nanotube
sPAES	Sulfonated poly(arylene ether sulfone)	SWNH	Single-walled nanohorn
SPE	Solid phase epitaxial	SWNT	Single-wall nanotube
SPEEK	Sulfonated poly(ether ether ketone)	SwRI [®]	Southwest Research Institute [®]
SPEK	Sulfonated poly-etherketone-ketone	S _y	Yield strength
SPEKK	Sulfonated polyether(ether ketone ketone)	SYT	Yttrium-doped strontium titanate
SPEX	Type of milling machine	T	Temperature
SPM	Scanning probe microscope	T, t	Ton, tonne
sPOSS	Sulfonated octaphenyl polyhedral oligomeric silsesquioxanes	T	Tesla (unit of magnetic induction)
S-PPSU	Sulfonated polyphenylsulfone	t	Time
SPS	Spark plasma sintering	T _{1bar}	Temperature at which equilibrium pressure of hydrogen is 1 bar for a hydrogen exchange reaction
sq. in.	Square inch(es)	Ta	Tantalum
Sr	Strontium		

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TA	Terephthalic acid	tf-Si	Thin-film silicon
TAG	Technical Advisory Group	TFSI	bis(Trifluoromethylsulfonyl)imide
TAMU	Texas A&M University	TFVE	Trifluorovinyl ether
TaON	Tantalum oxynitride	T _g , T _g	Glass transition temperature
TaPO	Tantalum phosphate	TG	Thermogravimetric; Theory Group
TBAB	Tetra- <i>n</i> -butylammonium bromide	TGA	Thermal gravimetric analysis; Thermogravimetric analysis; Thermogravimetric analyzer
TBA ₂ B ₁₂ H ₁₂	Tetra- <i>n</i> -butylammonium dodecahydrododecaborate	TGA-DSC	Thermo-gravimetric analysis-differential scanning calorimetry
TBABh	Tetra- <i>n</i> -butylammonium borohydride	TGA-MS	Thermogravimetric analysis-mass spectrometer
TBA-PF ₆	Tetra- <i>n</i> -butylammonium hexafluorophosphate	TG-DTA	Thermo-gravimetric/differential thermal analyzer
TBD	To be determined	THF	Tetrahydrofuran
TBMD	Tight-binding molecular dynamic	Ti	Titanium
TC	Templated carbon	TiCl ₃	Titanium trichloride
TC	Thermocouple	TiF ₃	Titanium trifluoride
TCCR	Transparent, conducting and corrosion resistant	TiH ₂	Titanium hydride
TCD	Thermal conductivity detector	Ti-IRMOF-16	Titanium (Ti) intercalated IRMOF-16
TCNE	Tetracyanoethylene	TiO ₂	Titanium dioxide (anatase)
TCO	Transparent conductive oxide	TIVM	Toroidal intersecting vane machine
TDDFT	Time-dependent density functional theory	TKK	Tanaka Kikinzoku Kogyo K. K.
TDLAS	Tunable diode laser absorption spectroscopy	<i>Tla</i>	Truncated light-harvesting chlorophyll antenna
TDS	Transitional demand scenario	<i>tla1</i>	Mutant of the Tla1 gene (GenBank Assession No. AF534570)
Te	Tellurium	<i>tlaR</i>	Mutant of unknown gene with a truncated light-harvesting chlorophyll antenna
te	Metric ton or tonne (1,000 kg)	<i>tlaX</i>	Mutant of unknown gene with a truncated light-harvesting chlorophyll antenna
TEA	Triethylamine	TM	Transition metal
TEA ₂ B ₁₂ H ₁₂	Triethylammonium dodecahydrododecaborate	TMA	Trimethylamine; Trimethylaluminum
TEAA	Triethylamine alane adduct	TMA	Thermal mechanical analyzer
TEAB	Tetraethyl ammonium borohydride	TMAA	Trimethylamine alane adduct
TEAH	Tetraethylammonium hydroxide	TMAB	Tetramethylammonium borohydride
TEAMS	tetraethylammonium methane sulfonic	TMAH	Tetramethylammonium hydroxide
TED	Triethylene-diamine	TMB	Trimethylborate
TEDA	Triethylenediamine	TMEDA	Tetramethylethane-1,2-diamine; <i>N</i> ¹ , <i>N</i> ¹ , <i>N</i> ² , <i>N</i> ² - tetramethylethane-1,2-diamine
TEM	Transmission electron microscopy	TMG	Tetramethyl guanidine
TEOA	Triethanolamine	TMOS	Tetramethoxy silane
TEOM	Tapered element oscillating microbalance	TMPP	Tetramethoxyphenyl porphyrins
TEOS	Tetra-ethoxy silane	TMPS	Trimethoxyl phenyl silane
tf	Thin film	TMPyP	Tetramethylpyridylporphine
Tf	Trifluoromethane sulfonate, or triflate anion (CF ₃ SO ₃ ⁻)	TNA	Titania nanotube array
TFA	Trifluoromethanesulfonic acid	TNT	Trinitrotoluene
TFAc	Trifluoroacetate		
TFE	Tetrafluoroethylene		
TFMPA	Trifluoromethylphosphonic acid		
TFMSA	Trifluoromethane sulfonic acid		
TF-RDE	Thin film rotating disk electrode		

TOC	Total organic content	um	Micrometer(s)
TOF	Turnover frequency	UM	University of Michigan
ToF-SIMS	Time-of-flight secondary ion spectroscopy	UMC	Unsaturated metal centers
TPA	Tripropylamine; Temperature-programmed adsorption	UMC	Ultramicroporous carbon
TPAH	Tetra-n-propylammonium hydroxide	UMCP	University of Maryland College Park
TPB	Triple phase boundary	UMSL	University of Missouri – St. Louis
TPD	Tonne(s) per day	UN	United Nations
TPD	Thermally programmed desorption; Temperature-programmed desorption	UNB	University of New Brunswick
TPDMS	Temperature-programmed desorption mass spectrometry	UNCC	University of North Carolina at Charlotte
TPPS	5,10,15,20-tetrakis(4-sulfonatophenyl) porphyrin	UNECE	United Nations Economic Commission for Europe
TPO	Temperature-programmed oxidation	UNLV	University of Nevada, Las Vegas
TPP	Tetraphenyl porphyrin	UNLVRF	UNLV Research Foundation
TPR	Temperature-programmed reduction	UNM	University of New Mexico
TPRD	Thermally-activated pressure relief device	UNR	University of Nevada, Reno
TPS	3-(trihydroxysilyl)-1-propane-sulfonic acid	UP-DW	Ultra-pure distilled water
TPV	Through plate voltage	UPE	Ultra-high molecular weight polyethylene
TRA	Technology Readiness Assessment	UPL	Upper potential limit
TRAIN	TrainingFinder Realtime Affiliate Network	UPS	Ultraviolet photoelectron spectroscopy
TRL	Technology readiness level	U.S.	United States
TRO	$\text{RuO}_2\text{-TiO}_2$	US06	Environmental Protection Agency vehicle driving cycle
Trityl	Chemical blocking group used to protect amines	USA	United States of America
tr. oz.	Troy ounce	USANS	Ultra-small angle neutron scattering
TW	Triangel wave	USB	Universal serial bus
UC	University of California	USC	University of South Carolina
UCB	University of California, Berkeley	USC	University of Southern California
UCF	University of Central Florida	USCAR	United States Council for Automotive Research, U.S. Cooperative Automotive Research
UCI	University of California, Irvine	U.S. DRIVE	United States Driving Research and Innovation for Vehicle efficiency and Energy sustainability
UCLA	University of California, Los Angeles	USFCC	United States Fuel Cell Council
UCONN	University of Connecticut	USM	University of Southern Mississippi
UCSB	University of California, Santa Barbara	USTAG	U.S. Technical Advisory Group
UDDS	Urban Dynamometer Driving Schedule	UT	University of Toledo
UEL	Upper explosive limit	UT	University of Tennessee
UFL	Upper flammability limit	UTC, UTC FC	United Technologies Corporation Fuel Cells
UGA	University of Georgia, Athens	UTC	University of Tennessee, Chattanooga
UH	University of Hawaii	UTCP	UTC Power
UHP	Ultra-high purity	UTRC	United Technologies Research Center
UHV	Ultra-high vacuum	UV	Ultraviolet
UIUC	University of Illinois, Urbana-Champaign	UV-vis	Ultraviolet-visual
UL	Underwriters Laboratory	UW	University of Washington
ULAM	Ultra-low-angle microtomy	V	Vanadium
ULSD	Ultra-low sulfur diesel		

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V	Volt	W/cm ²	Watt(s) per square centimeter
VA	Vinyl acetate	WDD	Water displacement desorption
VAC	Volts alternating current	We, W _e	Watt(s) electric
VACNTs	Vertically aligned carbon nanotubes	WG	Working group
VANTA	Vertically aligned nanotube arrays	WG-12	Working Group 12
VASP	Vienna ab initio simulation package	WGS	Water-gas shift
VaTech	Virginia Polytechnic Institute and State University	WGSMR	Water-gas shift membrane reactor
VB	Valence band	WGSR	Water-gas shift reactor
VBM	Valence band minimum	Wh	Watt-hour(s)
VBM	Valence band maximum	W(H ₂)	Gravimetric hydrogen storage capacity
VC	Vanadium carbide	W-h/kg	Watt-hour(s) per kilogram
VC	Vulcan carbon	W-h/L, Wh/liter, Wh/L	Watt-hour(s) per liter
VDC	Volts direct current	WHSV	Weight hourly space velocity
VDF	Vinylidene fluoride	Wind2H2	Wind to hydrogen demonstration project
VDOS	Vibrational density of states	W/kg	Watt(s) per kilogram
vdW	van der Waals	W/L, W/l	Watt(s) per liter
vdW-DF	van der Waals density function	W/m-K, W/m.K, W/mK	Watt(s) per meter-Kelvin (unit of thermal conductivity)
VFA	Volatile fatty acid	WMO	World Meteorological Organization
VFS	Vehicle fueling station	WO ₃	Tungsten trioxide
V(H ₂)	Volumetric hydrogen adsorption capacity	WP.29	Working Party 29 - World Forum for Harmonization of Vehicle Regulations
V(H ₂)	Volumetric hydrogen storage capacity	Wppm	Weight part(s) per million
VHSV	Volumetric hourly space velocity	WSTF	White Sands Test Facility
VHTR	Very high temperature gas-cooled nuclear reactor	wt	Weight
VHTS	Virtual high-throughput screening	Wt	Watt(s) thermal
VI	Venter Institute	wt%, wt.%	Weight percent (percent by weight)
V-I, V/I	Voltage – current	WTP	Well to pump
VIM/VAR	Vacuum induction melting/vacuum arc remelting	WTP	Water transport plate
VIR	Voltage-current-resistance	WTPP	Well-to-power plant
VIS	Visible light at 400-700 nm	WTT	Well-to-tank
V _{mp}	Micropore volume	w/v	Weight by volume
VMT	Vehicle miles traveled	WTW	Well-to-wheels
VOC	Volatile organic compound	X-	an anionic ligand such as chloride
VOC	Voltage open circuit	XAFS	X-ray absorption fine structure
Vol., vol.	Volume	XANES	X-ray absorption near-edge spectroscopy
vol%	Volume percent	XAS	X-ray absorption spectroscopy
V _{pore}	Total pore volume	XC72	High-surface-area carbon support made by Cabot
VT	Virginia Tech	XES	X-ray emission spectroscopy
W	Tungsten	XPS	X-ray photoelectron spectroscopy, X-ray photon spectroscopy, X-ray photoemission spectroscopy, X-ray photoluminescence spectroscopy
W	Watt(s)		
WAXD	Wide-angle X-ray diffraction		
WAXS	Wide angle X-ray scattering		
WBS	Work breakdown schedule		
WC	Tungsten carbon; Tungsten carbide		

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XPS-UPS	X-ray photoelectron-ultraviolet photoelectron spectroscopy	ZIF	Zeolitic imidazolate framework
XRD	X-ray diffraction	ZMOF	Zeolite(-type) metal-organic framework
XRF	X-ray fluorescence	Zn	Zinc
Y	Yttrium	ZnO	Zinc oxide
yr, YR	Year	ZPE	Zero point energy
YSZ	Ytria-stablized zirconia	zpp	Zirconium phenyl phosphonate
Z	Atomic number	Zr	Zirconium
ZEBA	Zero Emission Bay Area	ZrO ₂	Zirconium dioxide
ZEV	Zero emission vehicle	ZrSPP	Zirconium phosphate sulfophenylphosphonate
ZHS	Zinc hydroxystannate	ZVI	Zerovalent iron