

8. Acronyms and Abbreviations

°C	Degrees Celsius
21CTP	21 st Century Truck Partnership
3-D	Three-dimensional
ACC	Adaptive cruise control
ACE	Advanced Combustion Engines
ACEEE	America Council for an Energy-Efficient Economy
ACI	Advanced compression ignition
ACM	American Center for Mobility
ADAS	Advanced driver-assistance system
ADOPT	Automotive Deployment Options Projection Tool
AEO	Annual Energy Outlook
AFDC	Alternative Fuels Data Center
AFV	Alternative fuel vehicle
Ah	Ampere hour
AI	Artificial intelligence
Al	Aluminum
AM	Additive manufacturing
AMR	Annual Merit Review
ANL	Argonne National Laboratory
API	Application programming interface
APS	Advanced Photon Source
ARL	U.S. Army Research Laboratory
ARPA-E	U.S. Department of Energy Advanced Research Projects Agency-Energy
ASTM	American Society for Testing and Materials
BatPac	Battery Performance and Cost
BEAM	Behavior, Energy, Autonomy, and Mobility
BEAM CORE	Behavior, Energy, Autonomy, and Mobility Comprehensive Regional Evaluator
BEV	Battery-electric vehicle
BG&E	Baltimore Gas & Electric
BNL	Brookhaven National Laboratory

BOB	Blendstocks for oxygenate blending
BP	Budget Period
BSFC	Brake specific fuel consumption
BTE	Brake thermal efficiency
BTFE	bis(2,2,2-trifluoroethyl) ether
BWI	Baltimore/Washington International Airport
C	Charge rate
CAFE	Corporate average fuel economy
CAM	Cathode active material
CAMP	Cell Analysis, Modeling, and Prototyping Facility
CAN	Controlled area network
CARB	California Air Resources Board
CARMA	Cooperative automation research mobility applications
CAV	Connected and automated vehicle
CAVE	Connected and Automated Vehicle Environment
CBO	community-based organizations
CCF	Carbon-carbon fiber
CDA	Cylinder deactivation
CDA	Cooperative driving automation
Ce	Cerium
CE	Coulombic efficiency
CEI	Cathode-electrolyte interface
CeO ₂	Ceria
CF	Carbon fiber
C-F	Carbon-fluorine
CFD	Computational fluid dynamics
CFM	Complex framework materials
CFO	Clean Fuels Ohio
CFR	Cooperative Fuel Research
CFRC	Carbon fiber reinforced composite
CFRP	Carbon fiber reinforced polymer
CFTF	Carbon Fiber Technology Facility

CI	Carbon intensity
CI	Compression-ignition
CIP	Contact ion pairs
cm	Centimeter
CMU	Carnegie Mellon University
CNG	Compressed natural gas
CNT	Carbon nanotube
CO	Carbon monoxide
Co	Cobalt
CO ₂	Carbon dioxide
COVID-19	Coronavirus disease 2019
Cr	Chromium
CRADA	Cooperative research and development agreement
CRT	Continuously regenerating trap
CS	Cooled spray
CT	Computerized tomography
CTE	Coefficient of thermal expansion
Cu	Copper
CV2X	Cellular vehicle-to-everything
CVD	chemical vapor deposition
DC	Direct current
DC/DC	Direct current/direct current
DEIA	Diversity, Equity, Inclusion and Accessibility
DEMS	Differential Electrochemical mass spectroscopy
DFI	Ducted fuel injection
DFT	Density function theory
DFT	Discrete Fourier transform
DI	Direct injection
DIC	Digital image correlation
DMC	Dimethyl carbonate
DME	Dimethyl ether
DNS	Direct numerical simulation

DOC	Diesel oxidation catalyst
DOC-F	Combined diesel oxidation catalyst and diesel particulate filter
DOE	U.S. Department of Energy
DOT	[state or city] Department of Transportation
DOT	U.S. Department of Transportation
DOTs	Departments of Transportation
DPF	Diesel particulate filter
DRIFTS	Diffuse reflectance infrared Fourier transform microscopy
DSF	Dynamic skip-fire
DSRC	Dedicated short-range communication
DWPT	Dynamic wireless power transfer
E10	10% ethanol, 90% gasoline fuel blend
E100	100% ethanol, 0% gasoline fuel blend
E85	85% ethanol, 15% gasoline fuel blend
EC	Ethylene Carbonate
Eco ATCS	Ecological Adaptive Traffic Control System
EDAX	Energy dispersive X-Ray analysis
EDT	Electric Drive Technology(ies)
EDU	Electric drive unit
EEJ	Energy and Environmental Justice
EEMS	Energy Efficient Mobility Systems program
EERE	Office of Energy Efficiency and Renewable Energy
EGR	Exhaust gas recirculation
EIA	Energy Information Administration
EIS	Electrochemical impedance spectroscopy
EJ	Environmental Justice
ELT	Electrification program
EM	Electromagnetic
EMA	Engine Manufacturers Association
EMC	Electromagnetic compatibility
EMI	Electromagnetic interference
EPA	U.S. Environmental Protection Agency

EPD	Electrophoretic deposition
EPR	Electron paramagnetic resonance spectroscopy
EPRI	Electric Power Research Institute
EV	Electric vehicle
EVI	Electric vehicle infrastructure
EVs@Scale	Electric Vehicles at Scale Consortium
EVSE	Electric vehicle supply equipment
EVSP	Electric vehicle service provider
EZMT	Energy Zones Mapping Tool
Fe	Iron
FEA	Finite element analysis
FEC	Fluoroethylene carbonate
FEC	Functional electrocatalysts
FEMC	Methyl 2,2,2-Trifluoroethyl Carbonate
FHWA	Federal Highway Administration
FLHCE	Fluorinated localized high-concentration electrolyte
FM/LM	First mile/last mile
FOA	Funding opportunity announcement
FOTW	Fact of the Week
FRESCO	Fast, Robust Engine Simulation Code
FSLW	Friction-stir linear welding
FSP	Friction-stir processing
F-SPR	Friction self-piercing rivet
FSW	Friction-stir weld(ing)
FTE	Freight-ton efficiency
FTE	Full-time equivalent
FTIR	Fourier-transform infrared spectroscopy
FTP	Federal Test Procedure
FUSE	Flexible charging to Unify the grid and transportation Sectors for EVs at scale
FY	Fiscal Year
FY	Fiscal Year
g	gram

g/hp-hr	Gram per horsepower-hour
GaN	Gallium nitride
GBA	γ -butyrolactone
GCB	Graphene-enriched carbon black
GHG	Greenhouse gas
GHG	Greenhouse gas
GM	General Motors
GPa	Gigapascal
GREET	Greenhouse gases, Regulated Emissions, and Energy use in Transportation model
GSU	Georgia Southern University
GT-Power	Gamma Technologies - Power
H ₂	Hydrogen
HBCU	Historically Black Colleges and Universities
HC	Hydrocarbon
HD	Heavy-duty
HDOT	Hawaii Department of Transportation
HDPE	High-density polyethylene
HDV	Heavy-duty vehicle
HELICS	Hierarchical Engine for Large-scale Infrastructure Co-Simulation
HEV	Hybrid electric vehicle
HFR	High-rate friction rivet
HIL	Hardware-in-the-loop
HMI	Human-machine interface
HPC	High-performance computing
HPC	High-power charging
HPC	High-performance computing
HPDC	High-pressure die casting
HRE	Heavy rare earth
HRTEM	High-resolution transmission electron microscopy
HTC	High temperature carbonization
HVAC	Heating, ventilation, and air conditioning
HVO	Hydrotreated vegetable oil

HVR	High-velocity rivet
HyFi	Hybrid nanocomposite fibers
IACMI	Institute for Advanced Composites Manufacturing Innovation
IARIA	International Academy, Research and Industry Association
ICE	Internal combustion engine
ICME	Integrated computational materials engineering
IIC	Indiana Integrated Circuits
IIT	Illinois Institute of Technology
IMEP	Indicated mean effective pressure
IMSwTPG	Insulated metal substrate with thermally annealed pyrolytic graphite
IMU	Inertial measurement unit
INEXUS	Individual Experienced Utility-based Synthesis
INL	Idaho National Laboratory
IP	Intellectual property
IPM	Interior permanent magnets
ISO	International Organization for Standardization
ITE	Indicated thermal efficiency
ITS	Intelligent Transportation Systems
JBS	Junction barrier Schottky
JPO	Joint Programs Office
kg	Kilogram
ksi	Thousand pounds per square inch
kV	Kilovolt
kW	Kilowatt
kWh	Kilowatt hour
L	Liter
lb	Pound
LBNL	Lawrence Berkeley National Laboratory
LCA	Life-cycle analysis
LD	Light-duty
LDV	Light-duty vehicle
LES	Large eddy simulation

LFP	Lithium iron phosphate
LHCE	Localized high-concentration electrolyte
Li	Lithium
LiDAR	Laser imaging, detection, and ranging
LiF	Lithium fluoride
LiFSI	Lithium bis(fluorosulfonyl)imide
LightMAT	Lightweight Materials Consortium
Li-ion	Lithium-ion
LiPF ₆	Lithium hexafluorophosphate
Li-S	Lithium-sulfur
Li-TFSI	Lithium bis(trifluoromethanesulfonyl)imide
LLCF	Low life-cycle carbon fuels
LLNL	Lawrence Livermore National Laboratory
LLZO	Lithium lanthanum zirconium oxide
LMCP	Light Metals Core Program
LO	Light-off
LPG	Liquified petroleum gas (propane)
LSE	Localized saturated electrolyte
LT	Low-temperature
LTHR	Low temperature heat release
LTP	Low-temperature plasma
MA	Methyl acetate
mAh	Milliamp-hour
MAS	Micro-alloyed steel
MAT	Materials Technology Program
MD	Medium-duty
MEP	Mobility Energy Productivity
Mg	Magnesium
ML	Machine learning
mm	Millimeter
MMC	Metal matrix composite
Mn	Manganese

MOC	Mesoporous ordered ceramic
MOF	Metal organic framework
MON	Motor octane number
MOSFET	Metal-oxide semiconductor field-effect transistor
MOTION	MObility Technology Interstate Observation Network
MOVES	MOtor Vehicle Emission Simulator
MP	Methyl propionate
MPa	Megapascal
mph	Miles per hour
MPO	Metropolitan planning organization
MR	MOLECULAR REBAR®
MRL	Manufacturing Readiness Levels
msi	Million pounds per square inch
MSU	Mississippi State University
MTT	Materials Technical Team
MTU	Michigan Technological University
MUD	Multi-unit dwelling
MW	Megawatt
Mw	Molecular weight
MWBE's	Minority and women owned business enterprise
MWh	Megawatt hour
N/P	Negative electrode to positive electrode capacity ratio
N ₂ O	Nitrous oxide
NA	LiNi _{0.95} Al _{0.05} O ₂
NAFA	National Association of Fleet Administrators
NASEO	National Association of State Energy Officials
NATM	Co- and Mn-Free LiNi _{0.93} Al _{0.05} Ti _{0.01} Mg _{0.01} O ₂
Nb	Niobium
NBR	Nitrile rubber (nitrile-butadiene rubber)
NC	LiNi _{0.94} Co _{0.06} O ₂
NCA	Nickel cobalt aluminum oxide
NECST	Nanomaterials for Energy Conversion Storage Technology

NEMA	National Electrical Manufacturers Association
NEVI	National Electric Vehicle Infrastructure
NH ₃	Ammonia
NHTSA	National Highway Traffic Safety Administration
Ni	Nickel
nm	Nanometer
NM	LiNi _{0.95} Mn _{0.05} O ₂
NMC	Nickel manganese cobalt oxide
NMR	nuclear magnetic resonance
NO	Nitric oxide (nitrogen monoxide)
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NRC-Canada	National Research Council-Canada
NREL	National Renewable Energy Laboratory
NVH	Noise, vibration, and harshness
O	Atomic oxygen
OCPP	Open charge point protocol
ODBC	Organic direct-bond copper
ODD	Operational design domain
OEM	Original equipment manufacturer
OP2S	Opposed piston two-stroke
ORNL	Oak Ridge National Laboratory
OSU	Ohio State University
PAC	Project advisory committee
PAEK	polyaryletherketone
PAG	polyalkylene glycols
PAH	Polycyclic aromatic hydrocarbon
PAN	Polyacrylonitrile
PATH	Partners for Advanced Transportation Technology
PCB	Printed circuit board
Pd	Palladium
PDF	Pair-distribution function

PE	Polyethylene
PEAK	Polyaryletherketone
PEC	Pareto-efficient combustion
PECVD	Plasma-enhanced chemical vapor deposition
PEO	Polyethylene oxide
PERC	Propane Education and Research Council
PEV	Plug-in electric vehicle
PFPE	Perfluoropolyether
PFR	Plasma flow reactor
PGM	Platinum group metals
PHEV	Plug-in hybrid electric vehicle
PI	Principal investigator
PM	Particulate matter
PM	Permanent Magnet
PNNL	Pacific Northwest National Laboratory
POCs	Porous and mesoporous ordered ceramics
POFM	Porous organometallic framework materials
POLARIS	Planning and Operations Language for Agent-based Regional Integrated Simulation
PP	Polypropylene
PRF	Primary reference fuels
PSU	Pennsylvania State University
PTA	Polysulfide trapping additives
PU	Polyurethane
PUSP	Power ultrasonic surface processing
PVC	Polyvinyl chloride
PVDF	Polyvinylidene fluoride
PVP	Polyvinylpyrrolidone
Q&A	Question and answer
R&D	Research and development
RANS	Reynolds-averaged Navier-Stokes
RCM	Rapid compression machine
RDD&D	Research, development, deployment, and demonstration

RE	Rare earth
REV	Regional Electric Vehicle
Rh	Rhodium
RNG	Renewable natural gas
ROI	Return on investment
RON	Research octane number
rpm	Revolutions per minute
RWA	Real-world aging
S	Sulfur
SAC	Single-atom catalyst (catalysis)
SAE	Society of Automotive Engineers
SAE	Society of Automotive Engineers
SBIR	Small Business Innovation Research
SCAQMD	South Coast Air Quality Management District
SCE	Single-cylinder engine
SCI	Structural Composites, Inc.
SCM	Smart charge management
SCR	Selective catalytic reduction
SCRF	Selective catalytic reduction on filter
SEI	Solid-electrolyte interface
SEM	Scanning electron microscopy
SET	Supplemental Emissions Test
ShAPE™	Shear Assisted Processing and Extrusion
SI	Spark ignition
Si	Silicon
SiC	Silicon carbide
SIMS	Secondary Ion Mass Spectrometry
SLAC	Stanford Linear Accelerator Center
SMART	Systems and Modeling for Accelerated Research in Transportation
SNL	Sandia National Laboratories
SoC	State of charge
SO _x	Sulfur oxides

SPAN	Sulfurized polyacrylonitrile
SPH	Smoothed Particle Hydrodynamics
SPR	Self-piercing rivet
SRNL	Savannah River National Laboratory
SSAM	Surrogate Safety Assessment Model
SSCB	Solid state circuit breakers
SST	Solid-state transformer
STEM	Scanning transmission electron microscopy
SUMO	Simulation of Urban MObility
SURF	Scale-Up Research Facility
SVPWD	Space vector pulse width modulation
SVTRIP	Stochastic vehicle trip prediction
SwRI	Southwest Research Institute
TAT	Traffic Analysis Toolbox
TCO	Total cost of ownership
TEA	Techno-economic analysis
TEDB	Transportation Energy Data Book
TEM	Transmission electron microscopy
TFEPE	1,1,2,2-tetrafluoroethyl n-propyl ether
TFP	Tailored fiber placement
T _g	Glass transition temperature
TI	Technology Integration
Ti	Titanium
TiB ₂	Titanium diboride
TMS	Thermal management system
TNC	Transportation network companies
ToF	Time-of-Flight
TOU	Time of use
TPM	Thermo-Pseudo Mechanical
TRL	Technology readiness level
TuFF	Tailorable universal feedstock for forming
TVA	Tennessee Valley Authority

TWC	Three-way catalyst
TXM	Transmission X-ray microscopy
U.S.	United States
U.S. DRIVE	United States Driving Research and Innovation for Vehicle efficiency and Energy sustainability
UAM	Ultrasonic additive manufacturing
UAV	Unmanned aerial vehicle
UCC	Ultra-conducting copper
UCLA	University of California at Los Angeles
UCONN	University of Connecticut
UCSD	University of California-San Diego
UHMWPE	Ultra-high-molecular-weight polyethylene
UL	Underwriters' Laboratory
ULNO _x	Ultra-Low Nitrogen Oxides
UNM	University of New Mexico
UNT	University of North Texas
UPS	United Parcel Service
USABC	United States Advanced Battery Consortium
USAMP	U.S. Automotive Materials Partnership
USCAR	United States Council for Automotive Research
USPS	United States Postal Service
UT	University of Tennessee
UT	University of Texas
UV	Ultraviolet
UW	University of Wisconsin
V	Volt
V2G	Vehicle-to-grid
V2I	Vehicle-to-infrastructure
V2V	Vehicle-to-vehicle
V2X	Vehicle-to-anything
VAN	Vehicle Analysis Program
VARTM	Vacuum assisted resin transfer molding

VFAW	Variable frequency arc welding
Vhold	Voltage hold
VIL	Vehicle-in-the-loop
VIUS	Vehicle Inventory and Use Survey
VOICES	Virtual Open Innovation Collaborative Environment for Safety
VTO	Vehicle Technologies Office
VTOL	Vertical take-off and landing
WBG	Wide bandgap
Wh	Watt-hour
WHR	Waste heat recovery
WPT	Wireless power transfer
WSU	Washington State University
WVU	West Virginia University
XFC	eXtreme fast charging
XIL	Everything-in-the-loop
XRD	X-ray diffraction
ZEV	Zero-emission vehicle
Zn	Zinc
Zr	Zirconium
μm	Micrometer

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