

Appendix A. ACRONYMS AND ABBREVIATIONS

2D	two-dimensional
3D	three-dimensional
3BOB	three-ball-on-ball
3BOR	three-ball-on-rod
ACEM	aberration-corrected electron microscope
ADF	annular dark-field
AE	acoustic emission
AFM	atomic force microscope
Al	aluminum
AMCL	Advanced Materials Characterization Laboratory
ANL	Argonne National Laboratory
ASM	American Society for Metals
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
Ba	barium
BET	Brunauer-Emmett-Teller theory
BMO	base metal oxides
BU	Bournemouth University
CARES	Ceramic Analysis and Reliability Evaluation of Structures
CC	current collector
CCVD	combustion chemical vapor deposition
CDF	cumulative distribution function
CEN	Committee for European Normalization
CERT	Committee on Energy Research and Technology
CHIP	cold + hot isostatic pressing
CIM	chemically interactive material
CP	commercially pure
CVD	chemical vapor deposition
CF8C	an Fe-19Cr-12NiCNb austenitic stainless steel
CN-12	an Fe-25Cr-13NiCNNb austenitic stainless steel
CRADA	cooperative research and development agreement
CRT	continuously regenerating technology
CWRU	Case Western Reserve University
DDC	Detroit Diesel Corporation
DISI	direct-injection spark-ignition
DITS	dynamic indentation test system
DOE	U.S. Department of Energy
DPF	diesel particulate filter
DRIFT	diffuse reflectance infrared Fourier transform spectroscopy
DSC	dispersion-strengthened composite
DT	deformation twin
DTA	differential thermal analyzer
EDM	electro-discharge machining

EDS	energy-dispersive spectroscopy
EERE	Office of Energy Efficiency and Renewable Energy
EGR	engine gas recirculation
EPA	U.S. Environmental Protection Agency
EPMA	electron probe microanalysis
EVD	electrochemical vapor deposition
FCVT	FreedomCAR and Vehicle Technologies
FEA	finite element analysis
FEM	finite element method/finite element modeling
FTIR	Fourier transform infrared spectroscopy
GPa	gigapascals
HA-ADG	high-angle annular dark field
HC	hydrocarbons
HDI	high-density infrared
HFIR	High Flux Isotope Reactor
HIP	hot isostatic pressing
HS	high stress
HSWR	High-Strength Weight-Reduction Materials Program
HTML	High Temperature Materials Laboratory
HVOF	high velocity oxygen-fuel
IA	implementing agreement
IA-AMT	Implementing Agreement for a Programme of Research and Development on Advanced Materials for Transportation Applications
IITS	instrumented indentation test system
IEA	International Energy Agency
IEST	integrated engineered surface technology
INEEL	Idaho National Engineering and Environmental Laboratory
ISO	International Organization for Standards
JIS	Japan Industrial Standards
LANL	Los Alamos National Laboratory
LBNL	Lawrence Berkeley National Laboratory
LNT	lean NO _x trap
LS	low stress
LSCF	La _{0.6} Sr _{0.4} Co _{0.8} Fe _{0.2} O ₃
LST	laser surface texturing
Mg	magnesium
MMC	metal matrix composite
NASA	National Aeronautics and Space Administration
NDE	nondestructive evaluation
NiAl	nickel aluminide
NiCr	nickel chromium
NiCrFe	nickel chromium iron
NIST	National Institute of Standards and Technology
NO _x	oxides of nitrogen; nitrites/nitrates species

NPD	neutron powder diffraction
NSF	National Science Foundation
NSR	NO _x stoichiometric ratio
NTRC	National Transportation Research Center
OBD	on-board diagnostic
OFCVT	Office of FreedomCAR and Vehicle Technologies
OFHC	oxygen-free high-conductivity
OM	optical microscopy
ORNL	Oak Ridge National Laboratory
PBC	phosphate-bonded composite
PCA	principal component analysis
PM	particulate matter
PM	parts per million
PMT	photomultiplier tube
PNNL	Pacific Northwest National Laboratory
PoT	pin-on-twin oscillating wear test
Pt	platinum
PZT	lead zirconate titanate
RBS	rotary bend strength
RCF	rolling contact fatigue
RE	reference electrode
SACM	scanning acoustic microscopy
SAM	scanning auger microprobe
SAXS	small angle x-ray scattering
SCG	slow crack growth
SCR	selective catalytic reduction
SE	sensing electrode
SEM	scanning electron microscopy
SiC	silicon carbide
SIDI	spark-ignition direct-injection
SIUC	Southern Illinois University–Carbondale
SMPS	scanning mobility particle sizer
SOFC	solid oxide fuel cell
SO _x	oxy-sulfur species
SpaciMS	spacially resolved mass Spectrometer
SRBSN	sintered reaction-bonded silicon nitride
SRM	Standard Reference Material
SS	stainless steel
STEM	scanning transmission electron microscopy
TBCs	thermal barrier coatings
TEM	transmission electron microscopy
TFS	thru focal series
TGA	thermal gravimetric analysis (or analyzer)
Ti	titanium
TiAl	titanium aluminide

TiC	titanium carbide
TTBCs	thick thermal barrier coatings
TTZ	transformation-toughened zirconia
TWC	three-way catalyst
TWS	Third-Wave Systems
UHR-TEM	ultra-high resolution TEM
UHMW-PE	ultra-high molecular weight polyethylene
UTBM	University of Technology at Belfort-Montbéliard
WBDF	weak beam dark field
WC	tungsten carbide
XPS	X-ray photoelectron spectroscopy
XRD	X-ray diffraction/X-ray powder diffraction
YSZ	yttria-stabilized zirconia