Opportunities in Protection Materials Science and Technology for Future Army Applications

Committee on Opportunities in Protection Materials Science and Technology for Future Army Applications

National Materials Advisory Board and Board on Army Science and Technology

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Acronyms and Abbreviations

AlON	aluminum oxynitride
ARL	Army Research Laboratory
ARO	Army Research Office
ATC	Aberdeen Test Center (Maryland)
ATH	aluminum trihydroxide
ATPD	Army Tank Purchase Description
BAST	Board on Army Science and Technology
CIP	cold isostatic pressing
CNT	carbon nanotubes
CTE	coefficient of thermal expansion
CZM	cohesive zone models
DARPA	Defense Advanced Projects Research Agency

DMC	dynamic magnetic compaction
DoD	Department of Defense
DoE	Department of Energy
ERDC	Engineer Research and Development Cente (U.S. Army)
ESAPI	enhanced small arms protective insert
FGAC	functionally graded armor composites
FGM	functionally gradient material
FSP	fragment simulating projectiles
GHz	gigahertz
GPa	gigapascals
HEL	Hugoniot elastic limit
HMMWV	high-mobility multipurpose wheeled vehicle (Humvee)
HP	hot pressing
IBA	Interceptor body armor
ICME	Integrated Computational Materials Engineering (an NRC report)
ITAR	International Traffic in Arms Regulations
JHB	Johnson, Holmquist, and Beissel
M&S	modeling and simulation
MMC	metal matrix composites
MPa	megapascal
MZ	Mescall zone

NDE	nondestructive evaluation
NIJ	National Institute of Justice
NMAB	National Materials Advisory Board
NRC	National Research Council
NSF	National Science Foundation
NVI	normal velocity interferometer
OHPC	Omnipresent High-Performance Computing program
PAN	polyacrylonitrile
PBO	polybenzoxazole
PBZT	poly(benzobisthiazole)
PC	polycarbonate
PE	polyethylene
PMC	polymer matrix composite
PMD	protection materials-by-design
PMMA	polymethyl methacrylate
PPTA	polyparaphenylene terephthalamide
PU	polyurethane
PVB	polyvinyl butyral
QMU	quantification of margins and uncertainties
RHA	rolled homogeneous armor

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SAN	poly(styrene-co-acrylonitrile)

SAPI	small arms protective insert
SCS	shear compression (test)
SEM	scanning electron microscope
SiC	silicon carbide
SiSiC	siliconized silicon carbide
SPS	spark plasma sintering
TDI	transverse displacement interferometer
TEM	transmission electron microscopy
TPU	thermoplastic polyurethanes
UHMWPE	ultrahigh molecular weight polyethylene
UQ	uncertainty quantification
UV	ultraviolet
VISAR	velocity interferometry system for any reflector
V&V	verification and validation
XCT	x-ray computed tomography