

# INDEX

- acetylene black, 353
- adiabatic, 44
- adiabatic bulk modules, 45
- adiabatic sound speed, 54
- adiabatic temperature, 39
- $Al_2O_3$ , 277, 302
- AlN, 305
- AlN powder, 122
- aluminum oxide, 277, 302
- Amorphous  $Al_2O_3$ , 279
- ANFO, 305
  
- Barker model, 186
- beads-on-string model, 118
- Big Bang, 3
- Birch-Murnaghan equation, 37, 237, 238
- black body radiation, 110
- boron nitride, 285
  
- C–J point, 66, 69, 71, 72
- c-BN, 285, 311
- carbon, 281, 352
- Ceramics Powders, 301
- Chapman-Jouget point, 68
- chemical equilibria, 206
- chemical kinetics, 239
- chemical potential, 177, 210
- chemical reactions, 236
- Clapeyron-Clausius equation, 203
- CMT model, 257, 269
- condensed-phase chemical reactions, 220
- conservation equations, 228, 260
- consolidation map, 9
- consolidation mechanism of diamond powders, 324
- constitutive equations, 253
- constitutive formulation, 262
- constitutive modeling, 227, 234
- constitutive relations, 240
- contact points deformation, 135
  
- continuum flow, 227
- continuum mixture calculations, 272
- continuum mixture theory, 257
- continuum models, 123
- continuum plasticity theory, 141
- contours, 255, 256
- conventional hypervelocity impact techniques, 19
- conventional shock compression techniques, 326
- conventional two stage light gas gun, 20
- copper, 96, 105
- copper-Constantan, 111, 112
- copper-Constantan sheet couple, 113
- CPT model, 141, 149
- crack free compacts, 304
- crystallite size, 295, 315
- CSQ code, 91, 304, 312
- cubic anvil high pressure apparatus, 338
- cubic diamond, 282
- cubic packing of spheres, 13
- cubic-BN, 311
- CW x-ray velocity meter, 84
- cylindrical fixture, 282
- cylindrical technique, 94
  
- dendritic particles, 354
- dense form of carbon, 283
- densification curves, 335
- detonation wave, 66
- diamond, 310, 318
- diamond, 1, 17, 250
- diamond + silicon, 329
- diamond anvil, 16, 17
- Diamond Anvil Cell, 17
- diamond compacts, 322
- diamond composites, 326
- diamond-like carbon, 283
- diffusion type phase transition, 17
- diffusivity enhancement, 164

- dislocation density, 52, 279
- dislocation motion, 5
- distributions of shock pressure, 89
- distributive mixing, 168
- DLC, 283
- double shock compression, 288
- double shock-treated w-BN powder, 299
- Dugdale-MacDonald relation, 36, 38
- DYNA2D, 248
- dynamic consolidation, 159, 301
  
- E-BN, 297
- elastic response, 43, 143
- elastic stresses, 46
- elastic-plastic behavior, 53
- elastic-plastic response behavior, 144
- elastic-plastic transition, 31, 205
- elasto-plastic stress, 152
- electromagnetic gauge technique, 99
- emf, 111
- emissivity, 107
- energy composition, 174
- energy conservation, 231
- energy localization, 12
- entropy, 27
- EOS, 16, 133
- equation of energy conservation, 24
- equation of state, 16
- excess pressure, 246
- exothermic chemical reaction, 326
- exothermic reaction, 305, 308
- exothermically reactive additives, 327
- explosive technique, 89
- explosive lens, 89
- explosives, 70
  
- Faraday's law, 99
- filamentary crystals, 348
- first-order phase transitions, 10, 199
- flash x-ray diffraction, 286
- flash x-ray shadow graph, 83
- flyer tube technique, 95
- free energy functions, 215
- free surface velocity, 31, 64
- frictional sliding, 156
- fused silica, 109, 110
  
- g-BN, 285
- Galilean principle of relativity, 25
- Gibbs free energy, 210, 215
- Gibbs potential function, 212
- grain growth of z-BN, 345
- granular flow, 150
  
- graphite-like BN, 285
- Grüneisen coefficient, 28
- Grüneisen parameter, 32, 37
- gunpowder, 82
  
- Hall equation, 306
- heat detonations, 219
- HEL, 55, 98
- Helmholtz energy, 207
- Hermann's model, 133
- heterogeneous deformation, 303
- heterogeneous flow, 269
- heterogeneous melting, 206
- heterogeneous mixtures, 172, 187
- heterogeneous nucleation, 217
- heterogeneous powder mixtures, 166
- heterogeneous processes, 154
- hexagonal diamond, 283
- high dense form boron nitride, 336
- high strain rate, 6
- high temperature, 18
- hollow sphere model, 137
- Hooke's law, 55
- hot spots, 14
- Hugoniot, 23
- Hugoniot curve, 27, 28, 31, 35, 58, 71, 204
- Hugoniot equations, 32, 57
- Hugoniot jump conditions, 53
- Hugoniot slope, 54
- Hugoniot temperatures, 39
- hydrodynamic continuum equations, 232
- hydrodynamic instabilities, 165
- hydrodynamic jump conditions, 23
- hydrodynamic models, 123, 124
  
- ideal gas, 69
- ideal mixtures, 183
- ideal two-component mixture, 210
- idealized plane shock wave, 24
- ideally locking solid, 12, 124
- impact recovery arrangement, 252
- in-material gauge, 96
- inert mixtures, 191
- inhomogeneous deformation, 166
- inhomogeneous plastic flows, 164
- inorganic powders, 278
- inorganic shock chemistry, 234
- interaction of a shock wave, 62
- interface instabilities, 164
- interior projectile motion, 86
- interparticle bonding, 301
- ionization, 18
- iron, 281

- isentropic compression, 41
- jet trapping, 156
- jetting, 156
- jump conditions, 233
- kinematic relations, 138, 257
- kinetic constants, 14
- lattice energy, 34
- lattice strain, 292, 295, 315
- launcher tubes, 82
- line-broadening, 292, 313
- linear momentum, 230
- linear  $U-u$  relationship, 36
- link type very high pressure apparatus, 338
- localized melting, 11
- macroscopic deformation, 8
- magnetoflyer method, 83
- manganin gauge, 98, 105
- Manganin pressure gauge, 95, 102
- mass conservation, 73, 228
- mass diffusion, 14
- mass mixing, 9, 117, 160, 168
- mass transfer, 162
- mass transport, 160
- mechanical activation, 9
- mechanical models, 197
- metaphysical principles, 260
- microstructure, 315
- mixing of powders, 167
- mixture model, 194
- momentum jump condition, 57, 73
- momentum trap, 88, 89, 277
- mouse trap type, 89
- multi-wave structure, 31
- multiple reverberation, 102
- multiple shock reverberations, 100, 105
- multiple shock-compressions, 287
- Murnaghan equation, 41, 193
- Murnaghan relation, 188
- n-diamond, 283
- Ni-Al mixtures, 195
- Ni/Al, 165, 194, 245, 254, 271
- non-hydrostatic deformation, 42
- nucleation, 214, 216
- numerical simulation, 87, 91
- oblique impact, 80
- one-dimensional models, 5
- optical multichannel analyzer, 107
- $p-\alpha$  equation, 146
- $p-\alpha$  model, 132, 142
- $p-\alpha$  relation, 140
- $p-u$  curve, 125
- particle bonding, 154
- particle velocity, 105
- particle velocity histories, 99
- particle-velocity gauge, 99, 101
- particle-velocity measurement, 101
- particulate model, 117
- PISCES code, 91, 92, 251, 356
- planar impact, 60
- plane shock wave, 5, 89
- plane wave generator, 89
- plasma-like states, 19
- plastic deformation, 42, 47, 48, 136
- plastic potential, 47
- plastic response, 46
- Poisson's ratio, 56
- polycrystalline diamond, 91, 346
- polymorphic transformation, 10
- pore collapse, 137, 239
- pore collapse model, 140
- pore-collapse, 130
- post shock heating, 305, 307
- pressure effects, 217
- pressure histories, 93
- pressure measurements, 102
- projectile velocity, 82, 87
- punched triangle sheet explosive type, 90
- quartz, 105
- quartz-phenolic composite, 198
- quartz-phenolic mixture, 199
- quasi-isentropic dynamic compression, 21
- quasi-static powder compaction, 135
- Rankine-Hugoniot equation, 25
- rapid condensation, 346
- rarefaction, 59
- rarefaction waves, 64, 65
- rate equations, 212
- Rayleigh line, 26, 31, 54, 67, 68, 221
- reaction kinetics, 212, 213
- reactive powder, 219
- recovery assembly, 88
- recovery capsule, 88, 89
- recovery experiments, 76, 87
- recovery fixture, 89, 302
- reflected shock front, 246
- reflection of a detonation wave, 76
- residual temperature, 40, 41, 130, 220, 300
- reverberated shock-compression state, 104

