Index

A
Abandoned Mine Land Inventory System (AMLIS), 2
Absaroka Mountains, 170
acceleration, 33
ACIRL. *See* Australian Coal Industry Research Laboratories
activation energies, 53–54, 78
active sites, 56
additives, 51–52
adiabatic oxidation, 33
adiabatic oxidation methods, 61–64
adsorption and desorption of water moisture, 55, 57
Advanced Very High Resolution Radiometer (AVHRR), 242
aeromagnetic anomalies, 182–186
Africa, 245
agenda setting, 274–277
agglomeration, 48
aging, 37–38, 45–46
agriculture, effects on, 32
Aldridge Creek, 41, 102, 105
alunogen, 92, 94
AMLIS. *See* Abandoned Mine Land Inventory System
Anglo coal mines, 246
Angren coal deposit, 111
anorthite, 133
ANSYS software, 214
Archer till, 173
Argentina, 245
aromatic rings, 37
Arrhenius plots, 34
arsenic poisoning, 96
Asia, 110–112
asphaltenes, 98
Australia, 102, 245. *See also* Callide Coalfield; Northern Coalfield; Southland Colliery
Australian Coal Industry Research Laboratories (ACIRL), 62
AVHRR. *See* Advanced Very High Resolution Radiometer
Azerbaijan, 179

B
bacterial activity, 40
Baijigou coal mine, 224
barometric pressure, 40
basalt, 205
basket test, 66–68
Bayinshandan, 24
Beijing Remote Sensing Corporation (BRSC), 25
Benxi Formation, 24
Big Mine Run Road, 264
Biot number, 35, 69
bitumen, 36, 98
blending, stockpiles and, 46
blowing up in finite time, 35
borehole surveys, 206–207, 209
breccias, 138–139, 150. *See also* chimney structures
brown coals, 58–59
BRSC. *See* Beijing Remote Sensing Corporation
buchites, 118. *See also* paralavas
Buck Mountain coal bed, 261, 262, 263, 269
Burning Coal Draw, 163
Burning Mountain, 179, 245
buyouts, 262, 271–278

C
calcite, 146–149
calcium acetate, 52
Callide Coalfield, 63
Canada, 245. *See also* Aldridge Creek
carbonaceous shale, 40
Carbondale mine fire, 4–8
carbon dioxide
  Carbondale mine fire and, 7
  Centralia fire and, 264, 266
  coal-mine fires and, 1, 2
  Large mine fire and, 9
  low-temperature oxidation and, 37
  remote-sensing for estimation of, 240, 246–247
  temperature, oxygen concentration and, 4, 5, 6
carbon monoxide
  Carbondale mine fire and, 7
  Centralia fire and, 262, 266, 274
  as index gas, 41
  low-temperature oxidation and, 37
  subsurface temperature and, 12–13
  temperature, oxygen concentration and, 4, 5, 6
carboxyl groups, 37
carcinogens, 59
Carter, Jimmy, 273
catalysis, 55, 56–57
catenary effect, 56–57
caving characteristics, 40
cellular grout suppressants, 43
Centralia fire
  factors preventing control of, 264–266
  fire fronts of, 263–264
  geologic setting of, 262–263
  GLS processes in, 93
  Laurel Run fire versus, 261, 268–269
  overview of, 246, 261–262, 266
  policy and, 271–278
CERCLA. *See* Comprehensive Environmental Response, Compensation, and Liability Act
Chatkalsky Range, 112
Chelyabinsk Coal Basin, 146
chemical kinetics, 36–37, 63–64, 75
chimney structures, 104, 118, 160, 162
China
  coal fires in, 244–245
  detection of coal fires in, 199–200
  incidence of coal fires in, 33
  remote-sensing data for coal-mining areas in, 219–227
  statistics on coal-mine fires in, 39
  thermal-geological analysis and, 249–258
  See also Liu Huangou Coalfield; Longgu mine; Ruqigou-Gulaben coal basin; Wuda Coalfield
Clean Air Act, 276
climate, spontaneous combustion and, 25
clinker
  Centralia fire and, 264
  combustion metamorphism and, 103–104, 106–108
  gas-altered substrate (GAS) and, 93
  methods for dating, 161–162
  overview of, 118, 158–161
  of Powder River Basin, 156–157, 162–173
  See also paralavas
clinopyroxene, 133, 138, 141–142
coal dust, 43–44
coal factors, risk rating and, 20
coal fires, overview of, 200–202
Coal Mine Health and Safety Act, 276
coal mines
  control and suppression of fires in, 41–43
  hazard assessment for, 39
  origins of fires in, 39
  overview of spontaneous combustion in, 39
  before self-heating in, 40
  self-heating in, 41
coal rank, 54
coal seams, 25
coal templates, 276–277
Coaltemp program, 18
coccinite, 92
coking, 98, 105
colza oil, 48
combustion. *See* spontaneous combustion
combustion line–combustion zone, 26–27
combustion metamorphism
  characteristics of representative complexes of, 99–102
  control of distribution of fossil-fuel fires and, 103–104
  duration and age of fossil-fuel fires and, 105
  in geological history of sedimentary basins, 108–112
  in Hatrurim Basin, 133–135, 148–151
  heat transfer during, 104–105
  natural remanent magnetization and, 177, 178–179
  overview of, 97–98, 112–113
  physical conditions, general features and, 105–107
  process overview, 98
  in Rotowaro Coalfield, 117, 120–121, 130
  structure of complexes of, 104
  See also clinker
combustion plane–combustion system, 27
combustion spot–combustion center, 26, 27
compaction, 45, 48
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 276
condensation, gas-vent minerals and, 92–93
Congress, 262, 268, 271–278
Conrad, Joseph, 49
contact metamorphism, 137

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744046/9780813758183_backmatter.pdf
by guest

Cook Mountain, 172
copper acetate, 52
coquimbite, 92
cover depth, 40
CPT method. *See* crossing-point temperature method
cristobalite, 117, 126, 127
critical ambient temperature, 70
crossing-point temperature (CPT) method, 64–66. *See also* transient method (TM)
cubical containers, 73
cutting, as ignition source, 39

D
Dead Sea Rift Valley, 105, 110, 133, 137, 151
deep-depth exploration, 206
degassing, self-heating and, 38
degree of oxidation, 85
density, detection and, 205
Department of Minerals and Energy (South Africa), 15
depth, estimation of, 213–217
detection of concealed coal fires, 199–210, 224–226
dewatering, 57
diagenesis, 137
differential scanning calorimetry (DSC), 38, 60
differential thermal analysis (DTA), 38, 60
digging, 42, 48
DIPOLI-3 software, 180
distillation, 98
Dombroski, Todd, 262, 274
double ratioing method, 213
downeyite, 92
drip condensates, 93
drying method, spontaneous combustion and, 57
DSC. *See* differential scanning calorimetry
DTA. *See* differential thermal analysis
dust, coal, 43–44

E
economic implications, overview of, 32–33
EHAC (Explosion Hazard Advisory Committee). *See* Wits-Ehac Index
electrical resistivity, 205–206, 243
Emery Coalfield, 93
environmental hazards, overview of, 32–33
erosion, clinker and, 156, 158, 173
error estimates, 31
ethene, as index gas, 41
Europe, 245
"exhibiting blow up," 35
Explosion Hazard Advisory Committee (EHAC). *See* Wits-Ehac Index
explosion pipes, 133, 151–152
explosions, 33, 39, 49
extinguishing methods, 199, 202–203

F
faulting, spontaneous combustion and, 40
fayalite, 117, 124, 126–129, 144
FCC index, 64–65
feldspars, 127
Felix coal zone, 161, 163–166
Feng Chakravorty Cochrane index. *See* FCC index
filling, gallery, 42
fine-grained loose coals, 39
fireclays, 124
fire retardants, 42–43
fission-track analysis. *See* zircon fission-track (ZFT) analysis
fissures, 118, 160. *See also* gas-vent minerals
F-K parameter, 35–36
FLIR cameras. *See* forward looking infrared radiometer cameras
Flood, Daniel J., 268, 272, 274, 277
flow condensates, 93
foam/water injection, 42
focusing events, 275
Forestville, Pennsvylvania, 94–95
Fort Union Formation, 155, 156, 161
forward looking infrared radiometer (FLIR) cameras, 211, 213
fractures, 2, 39, 265
Frank-Kamenetskii (F-K) analysis
  coal dust and, 44
  critical value of F-K parameter and, 36
  infinite slab analysis and, 34–35
  overview of, 32, 34–36
  shipping of coal and, 48–49
  spontaneous combustion and, 34
  See also hot-storage test
freezing, gas-vent minerals and, 92
fulgurites, 195
fumaroles, 106
fuzzy logic techniques, 21

G
gallery filling, 42
gamma-ray logging, 206–207, 209
GAS. *See* gas-altered substrate
gas-altered substrate (GAS), 93–94
gases. *See* hydrocarbon gases; index gases; seam gases
gas-liquid–altered substrate (GLAS), 94
gas-liquid–precipitation (GLP), 94–95
gas-liquid–solidification (GLS), 93
gas reaction ± liquid-solidification (GRLS), 95
gas-vent minerals
  combustion metamorphism and, 104, 118
  gas-altered substrate and, 93–94
  gas-liquid–altered substrate and, 94
  gas-liquid–precipitation and, 94–95
  gas-liquid–solidification and, 93
  gas reaction ± liquid-solidification and, 95
  overview of, 91–92, 95
  sublimation and, 92–93
genesis-type model of spontaneous combustion, 23, 25, 29
geodetic surveys, 203–204
geoelectrical investigations, 205–206
geological exploration, 204–205
geologic setting, 25
Geo-Slope Temp/W finite-element modeling software, 214, 215
geothermal gradient, spontaneous combustion and, 40
germanium sulfide, 94–95
Gevanim Formation, 183–186
Ghareb Formation, 135, 137, 150, 178, 179
GIS (geographic information systems), 15, 20–21
GLAS. *See* gas-liquid–altered substrate
Glasser Tests, 15, 19–20
glasses, 127, 133, 146
Glauber's salt, 201
GLP. *See* gas-liquid–precipitation
GLS. *See* gas-liquid–solidification
government. *See* Congress; policy
Graham's ratio, 41
Gravel Terrace, 164, 170
greenhouse gases
  Carbondale mine fire and, 4–6, 7, 8
  gases from underground mine fires and, 2
  Large mine fire and, 6–8, 9–10
  overview of production of, 1, 13, 33
  Percy mine fire and, 8–12
  prevalence of fires and, 1–2
  remote-sensing for estimation of, 239, 246–247
  self-heating experiments and, 2–4
greigite, 179
GRLS. *See* gas reaction ± liquid-solidification
Grootegulux Mine, 20
grossite, 106
groundwater, 32, 39, 158, 173
grouting, 47–48
Gulaben coal basin. *See* Ruqigou-Gulaben coal basin
Gurim anticline, 151
Gurim Dome, 192

H
hanging-wall conditions, 40
Harrison, Frank, 272
Hat Creek fire, 112
Hatrurim Basin
  aeromagnetic anomalies in, 180
  geologic description of, 135–137
  hydrogarnet-zeolite-calcite rocks and hornfelses of, 146–149
  origin of paralavas of, 148–151
  overview of, 133–135, 151–152
  paralava mineral composition of, 142–146
  paralavas of olive unit of, 137–138, 141
  petrography of paralavas, host rocks of, 140, 141–142
  temperature and oxygen fugacity of, 148
Hatrurim Formation. *See* Mottled Zone complex
hatrurite, 106
hazard modeling, 39–40
Hazeva Formation, 135
health. *See* human health
heat, 2
heat capacity, 54
heat of reaction, 54
heat release rate, 34, 68–70
heat-release-rate method (HRRM), 68–70
heat sink mechanism, 55
heat transfer, 55, 104–105, 213
Hebron anomaly, 183–186
Heinz, H. John, III, 272, 277
Helan Mountains, 24
Helan Shan mountain range, 220
hematite, 122–126, 205
hornfelses, 135, 138–141, 146–148
hot-gas jets, 106

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744046/9780813758183_backmatter.pdf
by guest

hot spots, 199, 202, 203–205
hot-storage test, 66–68
Housing and Urban Development (HUD), 271, 274
HRRM. *See* heat-release-rate method
Huangbaici mine, 24
HUD. *See* Housing and Urban Development
human health, 32–33, 91, 96
humidity, 55–58
Hunter Valley, 245
hydraulic sand stowing, 42
hydrocarbon gases, 133, 151, 178–179, 192, 195
hydrocarbons, 59, 201
hydrogarnet-zeolite-calcite, 146–149
hydroperoxides, 36–37
hydrothermal alteration, 137, 150
hydrous sulfates, 92
hydroxyl groups, 37
hyperkeratosis, 96

I
ignition
  causes of, 39, 76, 103, 240
  moisture and, 55
  in Powder River Basin, 158
  See also time to ignition
IMCO test, 49–50
index gases, 41, 76
India, 244. *See also* Jharia Coalfield; Raniganj coal belt
Indonesia, 245
induction logging, 207–210
inert gas injection, 42
inflexion-point temperature (IPT), 65
infrared exploration, 203–204. *See also* forward looking infrared radiometer cameras; thermal anomalies
inhibition, 38, 51–52
initial rate of heating (IRH), 40, 61–62
inorganic additives, 51–52
Institute for Cokemaking and Fuel Technology, 60
internal surface area, 56
International Organization for Standardization (ISO), 49–50
international standards, 48–49
IPT. *See* inflexion-point temperature
Iran, 99
IRH. *See* initial rate of heating
iron, 48, 118–126, 130
ISO. *See* International Organization for Standardization
isochemical processes, 91, 92–93
Israel, 99, 105
Issyk-Kul region, 245

J
Jharia Coalfield, 32–33, 41, 212–213, 244
Jhingurdah seam, 51
Jordan, 99
Junggar Basin, 110

K
Kalimantan, 245
Kamenetskii. *See* Frank-Kamenetskii (F-K) analysis
Kanjorski, Paul, 272
Kazakhstan, 100
Kenderlyk Depression, 105
Kidod Formation, 151
kinetic constants, 53–54
kinetics, 36–37, 63–64, 75
Knobloch coal zone, 155, 161, 170–172
Kunlin Mountains, 24
Kupakupa coal seams, 119
Kuraminsky Range, 112
Kuznetsk Coal Basin, 103, 108, 110

L
Lake De Smet coal zone, 161, 163, 165, 166
land-cover analysis, 219–227
Landsat-5, 43, 219–227, 229
Landsat-7, 219–227, 229, 237, 242
Large mine fire, 6–8, 9–10
LAST function. *See* linear anomaly surface transect function
Laurel Run fire
  Centralia fire versus, 261, 268–269
  factors aiding control of, 267–268
  fire front of, 267
  geologic setting of, 266–267
  overview of, 261–262, 266
  policy and, 271–278
leveling, 48
liability indexes, 40, 65
lightning, 38–39, 76, 179, 195, 240
lignite, 58–59, 98
linear anomaly surface transect (LAST) function, 211, 214–217
Little Thunder Creek, 163
Little Wolf Mountains, 164, 168–170
Liu Huangou Coalfield, 41
Llewellyn Formation, 93, 263, 264
Locust Mountain anticline, 263–264, 268
Longgu mine, 42
loose coals, 39
Love Canal, 277
low-rank coals, 58–59
low-spatial-resolution satellites (LSRS), 230
low-temperature oxidation. *See* oxidation
LSRS. *See* low-spatial-resolution satellites
lung cancer, 96
Luzerne County Redevelopment Authority, 266, 274

M
machinery, 39
maghemite, 179
magmatism, 195
magnetic anomalies
  detection of concealed coal fires and, 199, 205
  interpretation of data for Mottled Zone and, 180–182
  methodology for studying, 179–180
  processes causing, 180–182
  See also natural remanent magnetization (NRM)
magnetic logging, 210
magnetite, 117, 127–129, 205
magnetite-hematite-spinel assemblages, 122–126
Mahadevan and Ramlu index. *See* MR index
Mammoth coal bed, 263
Marcelina Formation, 179
Marcos Shale, 93
Markha River, 101
mass-transfer processes, 91, 93–95
Matuyama-Brunhes paleomagnetic reversal, 173
maximum safe temperature rise, 35
MEA-1A retardant, 42
melted-vitrified scoriaceous rocks, 118. *See also* paralavas
melting, combustion metamorphism and, 106, 134
Menuha Formation, 178
metamorphism. *See* combustion metamorphism
methane
  Carbondale mine fire and, 6, 8
  coal mine fires and, 1
  Large mine fire and, 10
  remote-sensing for estimation of, 240, 246–247
  subsurface temperature and, 12–13
method of point-source inversion (MPSI), 250, 253–258
microfractures, 39
micromagnetic profiles, 186–187, 191, 193–194
microseismicity, 208
microtremors, 199
Middelburg Colliery, 33, 39, 41
millosevichite, 94
mine environmental indexes, 40
minerals. *See* gas-vent minerals
Mishash Formation, 135, 138, 177, 178
modeling, 211, 213–217, 250–253
Moderate Resolution Imaging Spectroradiometer (MODIS), 229–237
MODIS. *See* Moderate Resolution Imaging Spectroradiometer
moisture, spontaneous combustion and, 51, 55–58, 75
Mongolia, 100. *See also* Wuda Coalfield
Montana, 166–172
Monterey Formation, 134
Mottled Zone complex (Haturim Formation), 99, 105–110, 134, 137, 177–179
Mount Carmel, 263
MPSI. *See* method of point-source inversion
MR index, 65
mud-volcano provinces, 133, 151–152
Musto, Ray, 272

N
nagelschmidtite, 135
natural coal fires, defined, 38
natural remanent magnetization (NRM), 178–179
Nelligan, James, 272, 277
new standards, 50
New Vaal Colliery, 86
New Zealand. *See* Rotowaro Coalfield
Ningxia Hui autonomous region, 24, 220, 244
nitrogen, 98
nitrogen oxides, 240, 246–247
Nizhnyaya Tunguska, 112
noncatenary effects, 57
No. 6 fuel oil, 59
Northern Coalfield, 41, 51
Norway, 246
NRM. *See* natural remanent magnetization

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744046/9780813758183_backmatter.pdf
by guest

O
oil fields, 192–194
oil shale, 98
olive unit of Hatrurim Basin, 133, 137–138, 141, 150–152
orthoferrosilite, 117, 126–129
orthorhombic sulfur, 92
osteosclerosis, 96
oven-heating test, 66–68
ovoids of paralavas, 142–146, 147
oxidation
  chemistry of low-temperature, 36–37
  combustion metamorphism and, 98, 118
  moisture content, self-heating and, 56
  particle size and surface area and, 53
  spontaneous combustion and, 25, 28, 33, 241
  stockpiles and, 45
  See also pre-oxidation
oxygen
  fire penetration distance and, 158, 201
  greenhouse gas production and, 1, 3–5, 13
  scavenging of, burn prevention and, 85, 88–90
  spontaneous combustion and, 33, 38–39, 54–55

P
paleomagnetic orientation of clinker, 162
paralavas
  formation of, 134
  of Hatrurim Formation, 137–138, 140, 142–146, 148–150
  paleomagnetic orientation of clinker and, 162
  of Rotowaro Coalfield, 117, 124, 126–130
particle size and surface area, 52–53
Pennsylvania
  coal fires in, 246
  control and suppression of fires in, 41–42
  gas-liquid–precipitation processes in, 94–95
  policy and, 271–278
  See also Centralia fire: Laurel Run fire
Percy mine fire, 8–12
periclase, 106
peroxides, 36–37
petrographic composition, 40
plagioclases, 117, 141–142
platinum resistance thermocouples, 16, 18
policy
  Centralia and Laurel Run fires and, 261, 262, 265–266, 268
  congressional agenda setting and, 274–277
  Eleventh Congressional District of Pennsylvania and, 272–274
  lessons learned and, 277–278
  overview of, 271–272
policy stream, 275–276
political stream, 275
polynuclear aromatic hydrocarbons, 59
porcellanites, 117, 120, 124, 158–160
porosity, stockpiles and, 45
Pottsville Formation, 263
Powder River Basin
  coal bed fires in, 158
  combustion metamorphism and, 101, 103
  methods for dating clinker in, 161–162
  natural coal fires in, 38
  overview of, 156–158
  overview of clinker in, 162–173
pre-oxidation, 37–38, 45–46
problem stream, 275
progressive stages and products of coalfield fires, 23, 27–29
promoters, 52
propagation of coal fires, 23, 26–27, 29
pseudo-igneous rocks, 118. *See also* paralavas
pseudosection work, 206
pseudowollastonite, 135
pyrite, 55
pyrolysis, 98
pyrometamorphism. *See* combustion metamorphism

Q
Qinling Mountains, 24
Queensland, University of, 61–62, 76

R
R_{70} self-heating rate index, 62–63
radar, 205
radioactive methods. *See* U-Th/He dating of zircons
Ramlu index. *See* MR index
Raniganj coal belt, 244
rankings, 54, 59
Raster maps, 20–21
Ravat coal-bed fire, 103, 105, 111–112
Rayleigh number, 89
reaction rates, 53
reactive surface layers, 85–89
Reagan, Ronald, 272
Reconofax thermal scanner, 246
Red Ash coal bed, 261, 266, 269
Redstone River, 156
relocation funds, 262, 271–278
remote-sensing methods
  coal-mining areas in China and, 219–227
  detection of fires using, 43
  estimation of emissions using, 239, 246–247
  methods for, 242–243
  MODIS data and, 229–237
Renown Seam, 119
resistivity method, 205–206, 243
retrograde rocks, 141
risk, 20–21
risk index classification, 40, 62
Rochelle Hills, 155–156, 159, 163–166, 169–170
room-and-pillar mines, 2, 211, 212–213
Rosebud Creek, 156
Rosebud-Robinson zone, 161
Ross coal bed, 261, 266, 267, 269
Rotowaro Coalfield
  combustion metamorphism in, 120–121
  feldspars, silica minerals, opaques, glass of, 127
  hematite and Ti-spinel assemblages of, 126
  iron silicates of, 127
  location of, 118
  magnetite-hematite-spinel assemblages of, 122–126
  overview of, 117, 119–120
  oxidation of magnetite to hematite in, 126
  paralavas of, 117, 126–130
  slags of, 117, 122–126, 127–130
runaway ignition, 33
Ruqigou-Gulaben coal basin, 32, 219–227, 229–237
Russia, 245

S
Saharonim Formation, 183–186
salammoniac, 92, 95
sanidinite facies metamorphism, 107
SARA. *See* Superfund Amendments and Reauthorization Act
scoria, 118. *See also* paralavas
seam gases, 38
sedimentary basins, 108–112
seismo-acoustic investigations, 206
self-heating
  coal properties affecting, 54–58
  hazard modeling during, 39, 41
  overview of, 31–32, 33
  in stockpiles, 44–47
  in waste heaps, 47
  See also time to ignition
self-heating experiments, 2–4, 31
Seven Foot coal bed, 263
sewage, 42
Shangshihezi Formation, 24
Shanxi Formation, 24
shipping. *See* transportation of coal
Siberia, 101, 110–112
siderite, 124
silicate, 127
simulations of coal fires, 211, 213–217
Skidmore coal bed, 263
slags, 117, 120–130
slurry/ash injection, 42
SMCRA. *See* Surface Mining Control and Reclamation Act
sodium acetate, 52
South Africa, 246. *See also* New Vaal Colliery: Witbank Coalfield
Southland Colliery, 39
South Tisra Colliery, 213
Soviet Union, 245
Specter, Arlen, 272, 277
spinel, 122–126
spoil heaps, 47–48
spontaneous combustion
  abandoned mines and, 38–39
  adiabatic methods and, 61–64
  of coal dust, 43–44
  in coal mines, 39–43
  crossing-point temperature method and, 64–66
  effect of intrinsic coal properties on, 50–55
  effect of pre-oxidation (aging) on, 37–38
  experimental procedures for assessment of, 59–61
  Frank-Kamenetskii analysis and, 34–36
  heat-release-rate method and, 34, 68–70
  hot storage test and, 66–68
  inhibition of, 38
  low-rank coals and, 58–59
  low-temperature oxidation chemistry and, 36–37
  modeling of in Wuda Coalfield, 23–29
  moisture, humidity and, 55–58
  natural coal fires and, 38
  nomenclature overview for, 77–78
  overview of, 31–32, 33, 75–76, 241–242

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744046/9780813758183_backmatter.pdf
by guest

parameter values for, 78
in Powder River Basin, 158
reactive surface layers for prevention of, 85–89
in stockpiles, 44–47
transient method and, 70–75
transportation and, 48–50
in waste heaps, 47–49
See also self-heating; Wits-Ehac Index
"spontaneous combustion ladder," 41
spraying, waste heap fires and, 48
stages model, 23, 27–29
stalactites, 117, 123
Stanton-Empire mine, 267
steady-state approach, 66–68
stockpiles, 33, 44–47
sub-bituminous coals, 58–59
subcritical systems, 35, 36, 49–50
sublimation, 92–93
subsidence
Centralia fire and, 262, 264, 265, 266
clinker hillsides and, 160
effects on, 32
Laurel Run fire and, 266
oxygen supply, spontaneous combustion and, 38–39
as problem, 240
Sudan, 179
Suggate ranking, 63
Suhaitu mine, 24, 29, 256
sulfur content, 25–26, 38, 46–47, 98
sulfuric efflorescence, 201
supercooling, 92
supercritical systems, 35, 36, 49–50
Superfund Amendments and Reauthorization Act (SARA), 276
Surface Mining Control and Reclamation Act (SMCRA), 276
surface sealing, 42, 48
Svea Nord mine, 246

T
Taimur River, 104–105
Taiyuan Formation, 24
Tajikistan, 100, 111
Taqiye Formation, 135, 137, 150, 179
Taupiri coal seams, 119
Tauranga Group, 119
Te Kuiti Group, 119
temperature, 1, 12–13, 40
temperature-programmed reaction technique (TGA), 58–59
templates, policy and, 276–277
Tengiz deposit, 134
terrain, spontaneous combustion and, 25
TG. *See* thermal gravimetry
TGA. *See* temperature-programmed reaction technique
thallium poisoning, 96
thermal anomalies (LAST) function
depth estimation and, 211, 213
detection of concealed coal fires and, 201, 203, 242–243
MODIS analysis of, 229–237
surface temperatures and, 250
See also linear anomaly surface transect function
thermal-geological models, 249–258
thermal gravimetry (TG), 60
thermal runaway, defined, 33
thermocouples, 61, 71–74
thickness, 25, 38
Thornburgh, Richard, 272
Three Mile Island, 274, 277
threshold temperature, 241
Tien Shan, 111
time to ignition, 50
Times Beach, Missouri, 277
Ti-spinel, 126
titaniferous magnetite, 127–129
TM. *See* transient method
tomography, 206, 207
Tongue River Valley, 155–156, 159, 161, 164–172
topsoil, effects on, 32
total temperature rise (TTR), 40, 61–62
transient method (TM), 70–75. *See also* crossing-point temperature (CPT) method
transportation of coal, 48–50
trench cutting, 42
tridymite, 117, 126, 127
TTR. *See* total temperature rise
Tungus Coal Basin, 112

U
UBC process. *See* upgraded brown coal process
Ukraine, 246
Ulanbuhe Desert, 24
Ulm coal zone, 161
United Nations, 50
United States, 245
University of Queensland, 61, 62, 76
upgraded brown coal (UBC) process, 58–59
upgrading, 57–58
Utah, 93
U-Th/He dating of zircons, 155, 162–163, 166–168, 170, 243
Uzbekistan, 100, 111–112

V
vegetation, 32, 267
Venezuela, 179, 245
ventilation, 42, 45
vents. *See* gas-vent minerals
voidage, 45
volatile content, 51, 56
voltaite, 92

W
Waikito coal region, 119
Wasatch Formation, 156, 161
waste heaps, 47–48
water vapor production, 57
Waterburg coalfield, 21
welding as ignition source, 39
Western Middle Field, 261, 262–263
Wilkes-Barre synclinorium, 266
wind pipes, 48
wire-mesh basket test, 66–68
Witbank Coalfield, 21, 33, 39
Wits-Ehac Index, 15–21, 65
Wuda Coalfield
economic losses in, 32
gas-vent minerals and, 92, 94
modeling spontaneous combustion in, 23–29
MODIS data and, 229–237
overview of, 245
remote-sensing data for, 219–227
thermal-geological analysis and, 255–258
Wuda Mining Limited Liability Company, 24
Wuhai City, 24
Wuhushan mine, 24, 256
Wyodak-Anderson coal zone, 155–156, 159, 161, 163–164
Wyoming, 163–169

X
Xiashihezi Formation, 24
Xinjiang autonomous region, 24

Y
Yagnob River, 111
Yellow River, 24, 223, 226
Yellowstone caldera, 173
Youngstown mine, 8. *See also* Percy mine fire
Youth (Conrad), 49

Z
Zaisan Basin, 110
Zarnista, 194
zeolite, 146–149
ZFT. *See* zircon fission-track analysis
zircon fission-track (ZFT) analysis, 155, 161–165, 170
Zohar Formation, 180–181, 192
zones conducive to spontaneous combustion, 23, 28–29
Zoroastrim Fire Temple, 179

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744046/9780813758183_backmatter.pdf
by guest

Downloaded from https://pubs.geoscienceworld.org/books/chapter-pdf/3744046/9780813758183_backmatter.pdf
by guest