

Index

A

Abrasion resistance 2, 60, 193, 202, 258, 262
 Accelerators 282-283
 Acoustic applications 159, 164-165
 Active sonar 164
 Active systems 46
 Adhesion 116, 139, 142, 145, 147, 150
 promotion 117
 Adhesive interaction, types of 114
 Adhesion
 Additives, auxiliary 286
 Ageing test 315-316
 Agglomerates 4-5, 15, 20, 61, 74, 237
 Aggregates 4-6, 13, 15, 18, 19, 61-62, 74, 195, 237
 morphology 14
 structured 4
 Aircraft tyres 172
 Airship technology 176
 Airships 175
 Aluminium conductors 254-256
 Analysis, bi-dimensional 6
 Antidegradants 328, 330, 334-334
 Anti-fatigue mechanism 327
 Antioxidants 283, 313, 315, 328-329
 evaluation of 372
 mechanism 313, 321
 primary 239
 secondary 239
 Antiozonants 283-284, 322-323, 325-326, 328, 331, 332, 334
 chemistry 316
 Anti-rad stabilisers 377

Application specific integrated circuit 44-45
 Aramid 102-103, 106-107, 110, 125-128, 135, 138-141, 143-144
 Argon plasma 144
 Aromatic bismaleimide 73
 Atomic force microscopy 5-7, 13-15, 193
 Attenuated total reflection infra red spectroscopy 152
 Automated image analysis 6-8, 14, 15

B

Bakelite 119
 Batch curing process 291-292
 Batch mixing process 211-212
 Bayer method 325
 Belts 107
 Bis(diisopropyl)thiophosphoryl disulfide 72
 Bis(dimethylethoxysilylpropyl)tetrasulfide 67
 Bis(triethoxysilyl)-polybutadiene 71
 Bis(triethoxysilylpropyl)disulfide 70
 Bis(triethoxysilylpropyl) tetrasulfide 5, 14-15, 18, 19, 65, 67-68, 70-72, 75, 77, 79-80, 82, 86-88, 191-193
 Blends
 immiscible 219
 miscible 219
 Boundary lubrication 190, 200-201
 Brabender mixing cycle 85
 Butadiene rubber 1, 9, 14-15, 136, 142, 193, 221, 225, 268, 309-310, 332, 335

C

Cables

- aero* 297
 - aircraft* 297-298
 - air frame* 297
 - applications* 277
 - classifications* 251
 - components* 253
 - compounding* 287
 - control* 252
 - curing* 292
 - elastomers* 268, 272
 - high voltage* 265
 - industry* 264, 274
 - insulation* 269, 296
 - insulation – lapping method* 291
 - insulation covering application* 291
 - inter connect* 297
 - jacket materials* 249, 261-264, 267, 271-272, 297
 - jacket selection criteria* 264
 - marine* 303
 - materials for aerospace applications* 301
 - overhead* 250
 - polymer* 249, 259
 - power* 253, 266, 274
 - flexible* 252
 - rigid power* 251
 - sheathing* 267, 284
 - ship board* 303
 - spacecraft* 297, 300
 - special purpose* 252
 - thermoplastic elastomers* 274
 - transducer* 299
 - underground* 250
- Cabot elastomer composites 206-211
- compounding* 208
 - technology* 210, 214
 - vulcanisates physical properties* 209
- Calendering process 286, 404
- Calibration scale 10
- Carbon black 3
- aggregates* 3
 - agglomerate* 3
 - dispersion morphology* 13
 - mixing* 88
 - primary particles* 3
- Carbon fibre 104, 116
- Carbonisation 104-105
- Carbon-silica dual phase filler 195-202
- Carboxylated nitrile rubber 262, 272
- Cellulose 97
- Chain braking electron acceptors 314
- Charge-coupled-devices camera 9
- Chemical bonding 117
- Chemical modification 118
- grafting* 118, 142, 145, 233, 334
- Chlorinated polyethylene 273
- Chloroprene rubber 309
- Chlorosulfonated polyethylene 270-271, 297
- Chroman mechanism 123
- Coatings, blast mitigative 169
- Combat rubber raiding craft 178
- Compressed di-butyl phthalate number 210
- Conductors, water blocked 256
- Contact angle technique 152
- Continuous mixing process 212
- Continuous vulcanisation (cv) process 292, 293, 295
- Copolymerisation 275
- Copper conductor 255-256
- Copper, plain annealed
- Cord 108
- Corona discharge, resistance to 258
- Cornering forces 32
- Cotton 99, 107
- Coupling agents 64, 67-68, 71, 74-75, 86-88, 138, 213, 287
- Crepe hardening 394-395
- Crosslinked polyethylene 251, 257, 267, 276-279, 282, 289, 292, 294, 297-298, 302, 304
- Crystallisation 236
- Cured compounds 83, 88
- Curing
- agents* 282
 - oven* 403
 - process* 102
- Cyclisation 104-105

D

Data bus cable 297
 Diallyloxy-6-tert-butylperoxy-1,3,5-triazine 230
 Dibutyl phthalate absorption number 8
 Dicumyl peroxide 230
 Densitometry 19
 Dielectric constant 249, 258-260
 Dielectric loss 258, 260, 294
 Dielectric strength 258
 Differential scanning calorimetry -
 thermal activity monitoring 226
 Differential scanning calorimetry 316
 Digital binary images 15
 Digitisation process 9
 Dinitrophenylhydrazine treatment 358
 Diphenylmethane diisocyanate (mdi) 169
 Dipping 102, 118, 125, 128, 133
 N,N'-di-*n*-octyl-PPDA 323-324
 Dot number 30
 Drive-by reader 52
 Dry cure system 293
 Dry mixing 205-206, 208
 Dry skid resistance 200-201
 Drying process 213
 Dual extrusion system 293
 Dupont 125

E

Elasto-hydrodynamic lubrication 190
 Elastomers 1-2, 59, 64, 159-160, 165, 169, 179, 182, 189, 191, 288, 310, 313, 328, 330, 382-383, 386
 matrix 12
 organic 381
 ozone attack on 318
 reinforcement 2
 Electron dispersive x-ray analysis 150, 197
 Electron paramagnetic resonance 240
 Electron spin resonance 316
 Electron tomography 19-20
 Ethylene-norbornene 347-349
 Engineering thermoplastics 405

Epichlorohydrin rubber 309
 Esterification 101
 Ethylene-ethyl acrylate copolymer 309
 Ethylene-propylene-diene monomer elastomer 343
 Ethylene-propylene-diene rubber 319, 331, 334-335, 343
 Ethylene-propylene-diene terpolymer 124, 181, 220-222, 224, 226-228, 230-231, 233, 235, 237-238, 240-241, 250-252, 257, 260, 262, 267, 269-270, 277-279, 284, 285, 287-288, 289, 293, 304, 309, 343, 345-349
 compound composition 374
 crosslinking evaluation 361
 degradation 377
 radiochemical degradation mechanism 353
 Ethylene propylene rubber 226-228, 236, 250, 252, 269, 270, 277-279, 282, 309, 343, 346-346, 348-349
 Ethylene vinyl acrylate copolymers 273
 Extrusion method 291, 402

F

Fatigue testing 326
 Federal Communications Commission 47
 Fibre treatment 118
 Fibre types 97
 Fibre, use in tyre 153
 Fibreglass reinforced plastics 409
 Filaments 109
 Filler dispersion 8-9, 12, 14
 characterisation 5
 Fillers 8, 59, 69, 145, 189, 198-199, 206, 214, 258, 262, 284, 286, 289, 312-313, 392-393, 395
 reinforcement 2
 structure 3
 tyre applications 190
 Finite element analysis 405
 Fire resistant cables 297
 Flammability 298
 Flex cracking 326

Fluorinated polymers 275, 301
Fluorocarbon rubbers 274
Fluoroelastomer 299
Fluoropolymer resin 276
Fluorosilicone rubber 384, 388
Fractal geometry 8
Frequency hopping 50
FTIR spectroscopy 359

G

Gamma irradiation 359
Gaussian function 11
Graphite fibres 104
Graphitisation 104
Green tyres 77, 189, 203
Grosch abrasion and friction tester 203

H

High consistency rubber 385-386, 398, 401
vulcanisation 396
High plastic – low rubber blend 219
High-temperature polymer fibres 107
Hindered amine light stabiliser 314, 329
Homolysis 310
Hoses 107
Hovercraft 179
Hydrolysis 65-66, 69, 73, 141, 169, 233, 398
Hydroperoxide formation 365
Hysteresis properties 75

I

Image analysis 10, 14
Image digitisation 9
Image Pro® Plus software 9
Indian standard natural rubber 268
Inflatable seacraft 178
Inflation pressure 31
Infra red analysis 346, 352-353
microspectroscopy 355
spectroscopy 375
Insulation 165, 256, 267
selection criteria for 261

Integrated circuits 33
Intelligent tyres 29, 50
features 29
operation 51
readers 52
system design 37
Interdiffusion 117
Internal reflection spectroscopy 126
Intrusion barriers 182
Inverse gas chromatography 198
Iodometric titration 357
Ion scattering spectroscopy 151
Irradiation 346
high-energy 280
Isoprene 1

K

Kinetics 66, 68, 70, 85

L

Landing craft air cushion 179
Latex 132, 206
blending 221
rubber 122-123, 211
Lennard-Jones forces 73
Liquid injection moulding technology 405
Liquid silicone rubber 385-386, 399, 405
cure 398
Low-density polyethylene 276-277, 279
Low plastic – low rubber blend 220

M

Mass spectrometry analysis 349, 361
Mechanical bonding 115
Mechanical testing 75
Melt mixing 221
Melt processing 235
Melt rheology 237
Micro-electrical mechanical system device 34-35
Mercaptosilanes 70
Metal oxides 282
Microcrystalline waxes 322

Microdensitometry 8, 19
 Micro-elasto-hydrodynamic lubrication 190
 Micro-Fourier transform – infra red spectroscopy 356
 Microscopy 5
 Microwave dry curing process 293
 Mining cable 295, 297
 Mixing
 filler 205
 internal 290
 method 289
 mill 290
 open 290
 process 2, 6, 76, 86, 401
 reactive 88
 Mobile offshore base 184
 Modelling techniques, three-dimensional 8
 Modulus 113
 Mooney viscosity 76, 79, 81, 208, 268
 Morphology 2, 8, 14, 190, 203, 214, 219, 233-237, 241
 Morphometric analysis 7, 14, 18
 Moulding 401

N

NASCAR racing tyres 35
 Natural rubbers 1, 8-9, 15, 122, 136, 142, 145, 160, 165, 172, 179, 182, 200-202, 206-207, 211, 221, 223, 252, 262, 265, 267-268, 282, 309-312, 319, 321, 330, 331, 332, 334-335
 latex 206
 Nimitz-class aircraft carrier 174
 Nitrile rubber 221, 231, 262, 270-272, 282, 309, 323-324, 331
 hydrogenated 271-272
 Novolacs 230
 Nuclear magnetic resonance spectroscopy 127, 240, 316, 345
 Nuclear power cables 300, 302
 Nylon 102-103, 106, 120, 124, 179, 274-275

O

Organo-clays 205
 Organo-sulfonamides 72
 Original equipment manufacturers 54, 406
 Oxidation 105
 products analysis 356
 Ozone
 chemistry 316
 cracking 318
 protection 322, 324
 test 325

P

Paraffinic waxes 321-322
 Passenger tread compounds 200
 Payne effect 74-75, 79, 81-82, 191
 Peel tests 150
 Percolation 265
 Peroxides 223, 229, 357
 organic 396
 Peroxy radical recombination 367
 Phase imaging 14
 Phase mediators 213
 Phenolic resins 230, 232
 Photo-degradation 377
 Photo-oxidation 375-377
 Physical bonding 116
 Piezoresistive sensor 45
 Plane scanners 9
 Plasma polymerisation 144
 Plasma treatment 144
 Plasticisers 286, 287, 395
 Poly(butylene-2,6-naphthalate) 107
 Poly(ethylene naphthalate) 104-107
 Poly(ethylene terephthalate) 101, 106, 139
 Poly(paraphenylene terephthalimide) 97, 102
 Polyacrylate rubbers 272
 Polyacrylonitrile 104
 Polyamides 100, 253, 275
 Polychloroprene 160, 252, 270, 293, 297
 Polyester 101-102, 105, 125, 135, 138, 175, 252

- Polyisoprene rubber, synthetic 309, 331
- Polymer
blends 219, 221
matrix 1, 5, 11, 74, 189, 265, 282, 330
surface analysis 150
twisting 109
- Polymerisation 63, 100, 102, 120, 130, 275, 385-386
- Polyolefin rubbers 269
- Polyolefins radiolysis 364
- Polyphenylenesulfide 106
- Polypropylene 274-275
- Polysulfide rubber 180
- Polytetrafluoroethylene 275, 301
- Polyurethanes 1
- Polyvinyl chloride 250, 262, 267, 278, 281, 289, 298, 304
- Post-irradiation analysis 362
- Powdered rubber 210, 214
compounds 213
mixing 212
production 211
properties 213
technology 211
- Pressure sensor 45
- Pressurised liquid continuous vulcanisation system 293
- Processing aids 286
- Pullout tests 145, 146
- Pyrolysis gas chromatography – mass spectrometry 316
- Pyrolysis – Fourier transform – infra red spectroscopy 316
- Q**
- Quantimet image analysing computer 7
- Quinone diimines 330
- R**
- Radiation processing applications 344
- Radiation sources 344
- Radio frequency,
microwave 51
spectrum 49
- Radio frequency identification
application 50
chip 34
passive systems 47
passive technology 47
system 47
tags 29, 35, 41, 54
technology 31
- Radiochemical degradation 344
- Radiooxidation 364, 374, 377
- Random field method 20
- Raw rubber 1
- Rayon 99-100, 102, 106-107, 124, 133
cord 109
tyre cord 100
- Remote keyless entry systems 50
- Resols 230
- Resorcinol formaldehyde latex 118, 120, 122-125, 138-139, 145, 150
dip 134-135
pickup 132
ratio 132
treatment 129
- Rheology 219
- Room temperature vulcanisates 385-386, 409-410
condensation mechanism 40
curing 399, 400
- Rubber
amorphous 1
applications 1
bullets 181
chemical modification of 145
compounds durability 309
compounds microscopic imaging 1
industry 4, 6, 60, 104, 189
industry fibre 97
mixing 77, 116, 134
mixer, rotor 86
naval application 159
oxidation mechanism 310 311
process analyser 79, 84, 228, 238
sealants 180
treatment 145
oxidation resistance 315
ozone resistance 315
plastic blends 220

- thermoplastic* 1
 - thermoplastic blends* 219
 - space applications* 159
- S**
- Scanning electron microscopy 5, 138, 150-151, 316
 - Scanning transmission electron microscope 197
 - Scanning tunnelling microscopy 6
 - Scavenger-protective film mechanism 324
 - Semi conductive materials 266, 267
 - Sensor technology 45
 - SEPAP equipment 373
 - Side wall torsion sensor system 32, 35
 - Silane 68
 - Silane grafting 233
 - Silanisation reaction 70
 - Silanol groups
 - geminal* 63
 - isolated* 63
 - vicinal* 63
 - Silica
 - aggregates* 61
 - fumed* 60
 - highly dispersible* 60, 62
 - hydrated amorphous* 60
 - Silica-filled rubber compounds 59
 - Silica-loaded emulsion styrene-butadiene powdered rubber 213
 - Silica-rubber compounds mixing 77
 - Silica-rubber coupling characterisation methods 73
 - Silicon rubber 203, 272
 - application* 204, 406
 - chemistry* 382
 - classification* 386
 - manufacturing* 385
 - properties* 387-390
 - Silicon
 - structures* 384
 - types* 384
 - Silicone
 - gums* 392
 - polymer manufacturing process* 385
 - Silicone rubber 282, 296, 381
 - coatings* 409
 - compounding* 391-399
 - extrusion problem* 408
 - foams* 410
 - formulation* 391
 - moulding problem* 407
 - processing* 399
 - Sioplas technology 276, 280-281
 - Small angle neutron scattering 8
 - Small angle x-ray scattering 5, 8, 235
 - Softeners 286
 - Sol-gel process 20
 - Solid rocket propellants 166
 - Solution blending 221
 - Sonar rubber bow domes 161, 163
 - Spray-drying 62
 - Standard malaysian rubber 268
 - Starch 204
 - Static secondary ion mass spectrometry 152
 - Static testing 146
 - Stress-strain measurements 84
 - Styrene-butadiene copolymers 1, 8-9, 14-15, 70, 122, 136, 142, 193, 200, 213-214, 221, 225, 252, 265, 267-268, 282, 309-310, 321, 331
 - Styrene-butadiene rubber, emulsion form 213
 - Sulfur curing 282
 - Sulfur tetrafluoride treatment 358-359, 370
 - Sulfur vulcanisation 222, 224, 271
 - Sunchecking 317
 - Suncracking 317
 - Surface acoustic wave 45
 - Surface activity 4
 - Surface roughening 118, 138
 - Synthetic rubbers 1
- T**
- Tapping mode atomic force microscopy 14
 - Thiocyanatopropyl – triethoxysilane 65, 68
 - TEFZEL 276
 - Tensile properties 83

Thermal expansion coefficient 259
Thermogravimetric analysis 316
Thermolysis 357
Thermo-oxidation 375-376
Thermoplastic elastomeric olefins 220
Thermoplastic elastomers 219, 220, 221, 257
 classification 220
Thermoplastic polyester 275
Thermoplastic polymers 275
Thermoplastic polyurethanes 220
Thermosets 275
Thiocyanatopropyl-triethoxysilane 65
Torpedo launcher, elastomeric 182
Toxicity 298
Transmission electron microscopy 2, 5-7, 8, 13-14, 15, 19-20, 197, 208, 235
 image 17, 20
 image preparation 9
 micrographs 4, 8, 11-13, 15-17
 photomicrographs 241
Triazine antiozonant method 333
Trinitrotoluene 170
Triple extrusion system 293
Truck tyres 200
Turbostratic 104
Tyres
 carcass, reinforcement 106
 fibres 153
 industry 29
 mileage 54
 repair, patching process 42
 traction 32
 tread 36
 Tread Act 53
 tread wear 32
Tyre pressure monitoring system 36-37, 46
 wheel-based 35-56, 51

U

Ultramicrotomy 6
Ultra violet visible analysis 348, 356
Uncured compounds 81

V

VAMAC 272
Van der waals forces 2, 61, 73, 345-346, 393
Vinyl pyridine latex 120
Viscose rayon 98
Viscosity 130
Vulcanisation 1, 5, 41, 43, 62, 64, 75-76, 84, 134, 136-137, 191, 223, 238, 271, 330, 381, 396, 403, 405
 dynamic 219-221
 hot air 403
 peroxide 397
Vulcanisate, thermoplastic 220, 231-236, 238, 240-241
 antioxidants 239
 applications 240
 compounding 239
 production 221

W

Water blocked conductors, 256
Wet batch processing 206
Wet skid resistance 200-201, 205
Wet spinning 104
Wet traction 60
Wet-process hydrophobic 393
Wheatstone bridge circuit 45
Wheel-based system 41
Wide angle x-ray scattering 235
Wires, equipment 297

X

X-ray diffraction 316
X-ray photoelectron spectroscopy 127, 142, 151

Y

Yarns 108
Young's modulus 83-84, 110-111