

Index

- Acheson process, 106, 135
- advanced ceramics, definition, 1
- aerogel, 71
- alcogel, 63, 146
- aquagel, 63
- azeotropic distillation, 18, 146

- Bayer process, 17, 31
- BET equation, 148
- bioceramics, 8
- boranes, 97
- borazenes, 97, 113

- carbothermic reduction
 - silica, 20, 56, 74, 105, 129, 135
 - titanium dioxide, 129
- cation hydrolysis
 - at ambient temperature, 39
 - at elevated temperature, 115
- ceramics
 - brittle failure, 29
 - chemical resistance, 7
 - crystalline, 49
 - definition, 1
 - melting points, 4
 - oxidation resistance, 4, 79, 112
 - thermal conductivity, 3
 - thermal expansion, 3
- citrate gel process, 143, 146
- coatings
 - antireflectance, 75
 - by plasma-activated vapour
 - deposition, 136
 - by polymer pyrolysis, 111
 - catalytic, 54
 - coloured, 79
 - crack formation in, 54, 81
 - electrically-conducting, 78, 80
 - sol-gel, 53, 75, 80
 - thermal barrier, 7
 - world markets for, 7
- colloidal processing, 31
- colloids
 - definition, 34
 - lyophilic, 34
 - lyophobic, 34
 - non-aqueous, 55, 135
 - stability, 34
- composites, 33, 105, 111
- coprecipitation, 18, 146
- diphasic gel, 122
- drying control chemical additives, 70
- electroceramics, definition, 2
- electron-beam evaporation, 141
- electronic packaging, 10, 12
- electrostatic repulsion, 37, 55
- engineering ceramics, definition, 1
- extrusion, 29
- fibres
 - aluminosilicate, 52
 - boron nitride, 131
 - effect on toughness, 31, 105
 - optical, 97, 128
 - oxynitride, 109
 - polycarbosilane, 103, 145
 - Saffil, 52
 - silicon carbide, 80, 103
 - silicon nitride, 141
 - sol-gel coatings on, 79
 - sol-gel silica, 68
 - titanium nitride, 74
 - Tyranno, 106
- fine ceramics, definition, 1
- flame-hydrolysed powder, 56, 61, 127
- fracture toughness, 30
- freeze-drying, 144, 146
- fused ceramics, 20, 50, 52, 72, 131
- gel
 - cracking, 69
 - definition, 41, 62

Index

- gelation**
 external, 44
 internal, 43
gel permeation chromatography, 103, 109, 155
glass ceramics,
 compositions, 21
 sol-gel, 73
 synthesis, 20
green body, 25, 111
Griffith equation, 29
Guinier equation, 153

high- T_c oxide superconductors
 applications, 16
 1,2,3 phase, 13
 synthesis, 19, 20, 144, 147
homogeneous nucleation
 at elevated temperature, 115
 in alkoxide solutions, 82
 in gas phase, 124
hot isostatic pressing, 26, 49
hot-pressing, 26, 53, 66, 91, 142, 146
hydrogel, 63
hydrolytic stripping, 120
hydrothermal synthesis
 with metals, 123
 with phase transformations, 120
 with salt solutions, 115

imidohalides, 91
injection molding, 28, 111

Kelvin equation, 124

Lanxide process, 32
Laplace equation, 69
laser-driven reactions, 132
light scattering
 time-averaged, 115, 151
 time-dependent, 152

metal alkoxides
 cross condensation in, 66
 hydrolysis, 62, 64
 polymerisation in, 66
 purity, 61
 pyrolysis, 144
 synthesis, 58
 volatility, 61
metal-organic compounds, definition, 62
microwave drying, 74
monoliths
 crack-free, 69
 effect of impurities, 24
 polysilazane-derived, 96
 sol-gel, 55, 63, 66
 transparent, 55, 75, 146
Nicalon, 105
nitridation of silicon, 129, 134
nuclear fuel
 gel precipitated, 44
 pelleted, 20
 sol-gel microspheres, 43

organically modified silicates, 87
oxynitrides, 80, 109

peptisation, 40
phosphors, synthesis, 121
photon correlation spectroscopy, 152, 155
plasma derived powders, 136
plasma-spraying, 54, 74
polycarbosilanes
 molecular weight determination, 103
 synthesis, 101
polynuclear ions, 39
polysilanes
 infiltration by, 111
 purification, 101
 synthesis, 99, 107
polysilastyrene
 pyrolysis, 108
 synthesis, 107
polysilazanes, 96, 109, 111
polytitanocarbosilane, 106
powders
 agglomerated, 17, 127
 aggregated, 31, 97, 127, 135
 crack-free, 43
 ideal, 30, 133
 monodispersed, 82, 115
 powder mixing, 19, 49, 53, 121, 122

reaction-bonding, 27, 135
 post-sintered, 27
reductive dechlorination, 97

scanning electron microscopy, 150
Scherrer equation, 150
sedimentation method
 Andreassen pipette, 154
 Ladal centrifuge, 154
 ultracentrifuge, 154
sialons, 3
sieving, 155
silazanes, 95, 112, 135
silicon diimide, 89, 95
silicon disulphide, 140
silicon monoxide, 105, 129
silylamines, 95, 108
slip casting, 28

Index

- small-angle scattering
 - neutron, 48, 153
 - X-ray, 63, 153
- sol, definition, 33, 62
- sol-gel process
 - for abrasives, 50
 - for coatings, 53, 75
 - for fibres, 52, 68
 - for glasses, 55, 66
 - for nuclear fuel, 42
 - for sulphides, 96
 - using alkoxides, 63
 - using colloids, 40
- solid-state sintering, 23
- special ceramics, definition, 1
- spray-drying, 49, 146
- steric stabilisation, 38, 55, 85
- Stokes equation, 154
- Stokes–Einstein equation, 152
- superalloys, 2, 5
- supercritical drying, 56, 70
- supercritical liquid
 - critical parameters, 56
 - rapid expansion, 145
- supersaturated vapour, 125
- Synroc, 49
- technical ceramics, 1
- traditional ceramics, definition, 1
- transmission electron microscopy, 150
- tray-drying, 42, 56, 146
- Tyndall spectra, 83, 151
- Tyranno, 106
- uniaxial pressing, 25, 111, 122
- whiskers
 - formation, 124
 - silicon carbide, 80, 105, 108
 - silicon disulphide, 141
- xerogel, 70, 122
- X-ray line broadening, 47, 97, 121, 150