



## Keyword Index

- AAS, 1555  
Abrasion, 1853  
Abrasion resistance, 487  
Absorption, 19, 1975  
Accelerated curing, 1179  
Acceleration, 769, 857, 991, 1907  
Acid capacity, 1209  
Acid resistance, 717  
Acoustic emission, 1421  
Acoustic emission, (AE), 391  
Additives, 753  
Admixture, 185, 311, 455, 857, 917, 973, 1017, 1209, 1717, 1993, 2015, 2097  
Adsorption, 839, 1017, 1189, 1417  
AFt phase, 703  
Age, 1219  
Aggregate, 195, 429, 537, 581, 1927  
Aggregate–matrix interface, 1441  
Aggregate shape, 2021  
Air content, 799  
Alkali, 1403, 1943  
Alkali-activated cement, 139, 949  
Alkali activation, 349  
Alkali–aggregate reaction, 7, 495, 641, 1145, 1179, 1389, 1403, 1625, 1683, 1809, 2181  
Alkalis, 657, 1645  
Alkali–silica reaction, 103, 581, 1645, 2209  
Amorphous materials, 1669  
Analytical model, 1967  
Analyzing method, 1161  
Anhydrite, 2113  
Arresting cracking, 103  
Artificial neural networks, 1429  
ASR, 81, 1549  
ASR gel structure and formation, 1683  
Attack, 1275  
  
Ba-bearing sulfoaluminate cement, 2009  
Backscattered electron imaging, 781, 1093, 1661  
  
Basic magnesium chloride, 1555  
Bending properties, 59  
Biogenic sulfuric acid, 2223  
Blast furnace slag, 2329  
Bleeding, 275  
Blended cement, 13, 283, 769, 1341, 1787, 1899, 2103, 2175, 2277  
Blended cement mortar, 695  
Blend ratio, 587  
Bond strength, 195, 1167, 1331, 1919, 2159  
Boundary effect, 1321  
Brick, 711  
Brittleness, 391  
Brucite, 1555  
Brucite fiber, 1981  
  
 $\text{Ca}_3\text{Al}_2\text{O}_6$ , 1535  
 $\text{Ca}_{12}\text{Al}_{14}\text{O}_{33}$ , 1535  
Calcined oil sand fine tailings, 1235  
Calcium aluminate cement, 941, 1451, 1669, 1939  
Calcium aluminoferrite, 1535  
Calcium formate, 1051  
Calcium oxychloride, 1549  
Calcium silicate, 1697  
Calcium-silicate-hydrate (C-S-H), 1, 67, 139, 717, 857, 1093, 1481, 1521, 1529, 1625, 1683, 1733, 2029, 2191, 2297  
Calcium sulfate, 2113  
Calcium sulfoaluminate cement, 671  
Calcium sulfoaluminate hydrates, 703  
Calorimetry, 1421, 1873, 2045  
 $3\text{CaO} \cdot 3\text{Al}_2\text{O}_3 \cdot \text{CaSO}_4$ , 2261  
 $\text{Ca}(\text{OH})_2$ , 255, 1161  
Capillary water absorption, 19  
Carbonation, 119, 149, 571, 1103, 1189, 1251, 1599, 1859, 1975, 2191  
Carbon dioxide, 1489  
 $\text{Ca}_2\text{SiO}_4$ , 1535, 1873  
  
Cathodic protection, 681  
Cement, 311, 379, 611, 677, 1093, 1153, 1173, 1235, 1489, 1569, 1717, 1933, 2291  
Cement hydration, 2113  
Cement kiln dust, 299  
Cement manufacture, 941, 1933, 2083, 2245  
Cement mortar, 1967  
Cement paste, 1, 91, 185, 255, 329, 363, 439, 721, 839, 973, 991, 1111, 1459, 1541, 1633, 1645, 1697, 1733, 1823, 1919, 1987, 1993, 2097, 2153, 2251  
Cement production, 1313  
Cement–silica fume blends, 2319  
Characterization, 293, 341, 439, 781, 889, 949, 1471, 1725, 1817, 1837, 1881  
Chemical environment, 869  
Chemically bonded ceramics, 157  
Chemical shrinkage, 255  
Chert, 2209  
Chloride, 379, 421, 603, 711, 745, 991, 1073, 1967, 2103, 2291  
Chloride diffusion, 1561, 2251  
Chloride ion concentration, 1073  
Chloride ion diffusion, 695  
Chloride permeability, 537  
Chlorides, 1209  
Chromium, 1173, 1795  
Clinker, 657, 1313, 1365, 1795, 2079  
Coal combustion by-products, 1243  
Coarse fly ash, 549  
Color change, 1803  
Coloured compounds, 1987  
Compensation agent, 99  
Composite, 59, 157, 429, 435, 1167, 1189, 1357, 1981, 2283  
Compressive behavior, 2215  
Compressive strength, 13, 59, 133, 409, 487, 557, 593, 731, 849, 973, 1035, 1043, 1051, 1087,

- 1153, 1185, 1219, 1229, 1259, 1373, 1429, 1451, 1803, 1817, 1853, 1907, 2083, 2119, 2127, 2135, 2175, 2191, 2245, 2269, 2329, 2337
- Concrete, 31, 37, 43, 51, 165, 267, 293, 311, 321, 333, 391, 463, 487, 507, 563, 593, 603, 651, 737, 745, 813, 845, 889, 913, 927, 957, 1007, 1035, 1185, 1235, 1259, 1331, 1357, 1373, 1435, 1441, 1467, 1675, 1927, 1981, 1987, 2159, 2175, 2181, 2203, 2223, 2283, 2291, 2309, 2337
- Concrete wall interface, 821
- Condensed silica fume, 549
- Conductivity, 1007
- Corrosion, 165, 227, 571, 593, 603, 665, 829, 991, 1161, 1209, 1331, 1435, 1549, 1975, 2037, 2291
- Corrosion inhibitors, 1435
- Corrosion initiation, 603
- Corrosion of steel bars, 1781
- Cost, 267
- Coupling, 1131
- Crack, 711, 789, 1073
- Crack detection, 165, 495, 563, 1459
- Creep, 1121
- Crop-stalk-fibers leachate, 1081
- Crystallization pressure, 1613
- Crystal size, 869, 1521
- Crystal structure, 1297, 1481, 1521, 1845
- C-S-H, 1697
- C Sulfate, 1275
- Curing, 13, 1561, 1817, 2009, 2045, 2191
- Cycles, 119, 2037
- Damage mechanics, 2127
- Damage sensitivity, 965
- Debonding, 1441
- Decalcification, 1579
- Decomposition, 789
- Degradation, 563, 571, 581, 1251, 1859, 2223, 2297
- Degree of hydration, 587, 2045
- Delayed ettringite formation (DEF), 869, 1675, 2261
- Demolished concrete, 799
- Demoulding agent, 821
- Densified mixture design algorithm, 623
- Density, 845
- Desiccation shrinkage, 1131
- Differential scanning calorimetry, 695
- Diffusion, 463, 603, 711, 907, 1435, 1569
- Dispersion, 399, 839
- Drilled shaft, 207
- Drying, 807, 907, 1131
- Drying shrinkage, 99
- Durability, 249, 311, 321, 463, 571, 623, 681, 889, 991, 1145, 1251, 1307, 1421, 1467, 1579, 1859, 1927, 1975, 2103, 2223
- Early ages, 507
- EDX, 781, 1809
- Effective calcium oxide, 753
- Efficiency, 2175
- Elastic moduli, 67, 487, 651, 1219, 2127
- Electrical conductivity, 537
- Electrical permeability, 615
- Electrical properties, 329, 435, 481, 1007, 1837, 1889, 1893
- Electrical resistivity, 615, 695, 1209
- Electric arc furnace slag, 1881
- Electrochemical chloride extraction, 227
- Electrochemical properties, 681, 829, 1435, 2037
- Electroneutrality, 1967
- Electronic microprobe, 1823
- Electroplating sludge, 349
- Elevated curing temperature, 299
- Elevated temperatures, 2215
- Emissions, 1313
- Energy, 1489
- Environment, 1489
- EPMA, 1073
- EPS, 1259
- Equivalent inclusion method, 2067
- ERF slag, 941
- ESEM, 935
- Ettringite, 703, 869, 1243, 1297, 1341, 1613, 1669, 2261
- Ettringite formation, 7
- Ettringite–thaumasite, 1591
- Evaporation, 275
- Expansion, 7, 103, 731, 1145, 1341, 1389, 1421
- Expansive compounds, 1881
- FGD gypsum, 2119
- Fiber reinforcement, 59, 249, 329, 333, 671, 1145, 1229, 1259, 1919, 1981, 2135, 2283
- Fibers, 103
- Fiber surface treatments, 59
- Fibre reinforcement, 1025, 1357
- Filler, 1243
- Fineness, 1087, 1933
- Finite element analysis, 495, 2067
- Fire, 1001
- Fire performance, 109
- Fire simulation, 1633
- Flue gas desulphurization sludge, FGD, 1907
- Fly ash, 37, 99, 177, 195, 299, 311, 487, 537, 549, 631, 731, 781, 889, 957, 1017, 1087, 1161, 1179, 1199, 1787, 1837, 1889, 2057, 2061, 2091, 2209, 2269, 2329, 2337
- Fly ash–lime compacts, 753
- Fracture, 1441
- Fracture characteristics, 507
- Fracture criteria, 913
- Fracture energy, 1321
- Fracture process zone, 1321
- Fracture toughness, 429, 883, 913, 1357
- Freezing and thawing, 311, 799, 889, 1421, 1927
- Fresh concrete, 207, 219, 363, 631, 807, 917, 1381, 2141
- Friction, 1331
- Friction coefficient, 821
- Friedel's salt, 1057, 1549
- Fuzzy logic, 1429
- Genetic algorithm, 409
- Geopolymer, 195
- Glass, 1145, 1403, 2181
- Glass aggregate, 81
- Glass fibers, 429
- Glass powder, 81
- Granite, 7
- Granulated blast-furnace slag, 177, 1153, 1161, 1173, 1733, 1787
- Grinding, 133, 549, 557, 1365, 2277
- Groundwater, 1275
- Gypsum, 2119
- Gyrolite, 2029
- HAC, 1555
- Heat curing, 1341

- Heat evolution, 521
- Heating, 1633
- Heat of hydration, 2319
- Heavy metals, 149, 849, 957, 1103, 1173
- High calcium, 99
- High-performance concrete, 235, 409, 615, 623, 631, 1043, 1381, 1417, 1781, 2037, 2215, 2237
- High-range water reducer, 235, 2237
- High-strength concrete, 549, 1001
- High temperatures, 1065, 1803
- HSC, 1065
- Humidity, 275, 2045
- Hybrid fiber, 1065
- Hydration, 91, 207, 255, 439, 447, 949, 1451, 1459, 1541, 1669, 1697, 1787, 1907, 1939, 2009, 2153, 2319
- Hydration activity, 587
- Hydration heat, 1081
- Hydration process, 935
- Hydration products, 557, 849, 977, 1541, 1661, 1725
- Hydrochloric acid pretreatment, 521
- Hydrothermal, 1725
- Hydrothermal reactions, 1529
  
- Image analysis, 927, 1933, 1987
- Immiscibility, 1591
- Impact, 2067
- Impact echo, 1219
- Incinerator fly ash, 849
- Initial surface absorption rate, 321
- In situ neutron diffraction, 1633
- In situ quantitatively study, 935
- Intercalation, 1717
- Interface texture, 753
- Interfacial transition zone, 195, 463, 973, 977, 1025, 1167
- Intermittent wetting, 119
- Iodide, 421
- Ionic migration, 43, 51
  
- Jennite, 1481
  
- Kaolin, 1035
- Kinetics, 2057, 2141
- K-PS geopolymers cement, 935
- k-Value, 1035
  
- Layered double hydroxides, 1717
- Leaching, 149, 349, 1093, 1103
- Life-cycle inventory analysis, 1313
- Ligament effect, 1321
  
- Lightweight aggregate, 1809
- Lightweight concrete, 1121
- Lightweight structural concrete, 283
- Limestone, 1365
- Liquid glass, 1939
- Lithium, 1645
- Lithium compounds, 641, 1179, 1403, 1451
- Long-term performance, 829
- Loss on ignition, 1837
- Low-quality fly ash, 1467
  
- Magnesia–phosphate cement, 157
- Magnetic properties, 1889
- Magnetic resonance imaging, 1459
- Malic acid, 455
- Maturity, 651
- Mechanical properties, 37, 109, 177, 333, 435, 527, 671, 769, 889, 965, 1001, 1121, 2203, 2283, 2309
- Melting process, 587
- Mercury porosimetry, 321, 927, 1661
- Metaettringite, 703
- Metakaolin, 19, 721, 1035, 1235, 1733, 1943
- MgO, 157
- Microcracking, 391, 563, 799, 883, 965
- Micromechanics, 67, 333, 721, 883
- Microstructure, 1, 67, 91, 139, 227, 447, 463, 665, 721, 1025, 1093, 1167, 1389, 1535, 1569, 1625, 1661, 1669, 1893, 2045, 2061, 2297
- Microstructure changes, 1633
- Microwave processing, 807
- Migration, 1967
- Mineral admixture, 1381, 1781
- Mineralizers, 2135
- Mixing, 2237
- Mix proportioning, 2021
- Mixture design, 1153
- Mixture proportioning, 409, 665, 2237
- Modeling, 165, 255, 333, 341, 421, 495, 571, 651, 737, 769, 839, 1025, 1429, 1441, 1569, 1661, 1859, 1993, 2083, 2319
- Modulus of elasticity, 2091
- Moisture state, 31
- Molecular water structuring, 2251
- Monosulphate, 1341
- Mortar, 1, 99, 149, 235, 435, 481, 631, 665, 813, 1131, 1403, 1471, 1599, 1837, 2015, 2061
- MSWI ashes, 1899
  
- Multispecies transport, 2251
- Municipal solid waste incineration, 957
  
- Nanoindentation, 67
- Nano-SiO<sub>2</sub>, 1043
- NaOH addition, 299
- Nickel, 1795
- NMR, 379, 1943
- 1.13 nm tobermorite, 2029
- Numerical simulations, 1859
  
- Oil well cement, 1725
- Opal, 641
- Optimization, 1153
- Organic acids, 1823
- Organic materials, 59
- Orthogonal array, 1373
  
- Panel test, 1357
- Paper mill fibrous residuals, 1229
- Particle size distribution, 133, 1817, 2277
- Paste backfill, 1817
- Penetrability, 1111
- Penetration depth, 1073
- Penetration resistance, 631, 2015
- Permeability, 177, 293, 737, 1007, 1561, 2015
- Permeation quality, 321
- Pessimism proportion, 2209
- Petrography, 657, 1471, 1675
- pH, 813
- Phase equilibria, 1057, 1529
- Phosphogypsum, 677
- Physical properties, 481, 1111, 1893, 1981, 2203
- Plasticizers, 611
- Point counting, 1787
- Polarization, 481
- Polarization resistance, 829
- Polyester resin, 2091
- Polymer concrete, 2091
- Polymers, 185, 429, 611, 665, 1853, 1919, 2153, 2181
- Polysaccharides, 2153
- Pore size distribution, 43, 51, 1043, 1459, 2057, 2061, 2191
- Pore solution, 139, 537, 813, 1645
- Pore system, 321
- Pore volume, 695
- Pore water pressure, 2141
- Portland cement, 13, 119, 447, 455, 857, 1481, 1579, 1697, 1795, 2097, 2119, 2245

- Portland cement mortar, 527  
 Positron annihilation lifetime spectroscopy, 91  
 Potential energy, 1017  
 Potentiometric titration, 2291  
 Powder suspension, 813  
 Pozzolan, 1, 13, 731, 759, 1899, 2175, 2277  
 Pozzolan activity, 521, 1881  
 Pozzolan cement, 1051  
 Pozzolan reaction, 81, 615, 2269  
 PP fibers, 2215  
 Prediction model, 2269  
 Process of hydration, 1081  
 Properties of concrete, 1381  
 Protective layer, C-S-H, 1555  
 Pullout strength, 1167, 1919  
 Pulverized fuel ash, 349  
 Pumice aggregate, 845
- Quicklime, 769
- Radiotracer, 341  
 Rapid-setting cement, 807  
 Reactive transport, 1569  
 Recycled aggregates, 31  
 Recycled coarse aggregate, 799, 965  
 Recycling process, 965  
 Refractory cement, 157  
 Reinforced concrete, 2067  
 Reinforcement, 165, 2159  
 Reinforcement corrosion, 2159  
 Reject fly ash, 1907  
 Residual strength, 1065  
 Retardation, 2113, 2153, 2245  
 Rheology, 185, 219, 235, 363, 399, 527, 917, 1017, 1111, 1199, 1993, 2097, 2135, 2237  
 Rheometer, 1993  
 Rice husk ash, 521  
 Rietveld analysis, 1541  
 Rubber-filled high-strength concrete, 109  
 Rubberized concrete, 2309
- SAF, 1417  
 San fibers, 37  
 SBR latex, 527  
 Scale transition, 2251  
 Seawater, 593  
 Segregation, 1199  
 Self-compacting concrete, 249, 821, 1199, 2337
- Self-consolidating concrete, 917, 2103  
 Self-healing, 711  
 SEM, 7, 133, 227, 455, 657, 781, 789, 949, 1179, 1625, 1675, 1809, 1873, 2009, 2135, 2223  
 Service life, 745, 829  
 Setting, 2113, 2119  
 Setting time, 631  
 Shielding, 329, 1889  
 Shrinkage, 439, 671, 1087, 1121, 1251, 1893, 2141  
 Shrinkage-permeability, 283  
<sup>29</sup>Si NMR, Spectroscopy, 1683  
 Silica, 1943  
 Silica fume, 177, 311, 329, 537, 1051, 1121, 1167, 1235, 1259, 1389, 1625, 1733, 1803, 1889, 1893, 2309  
 Size effect, 1321  
 Slag, 537  
 Slag blended cement, 587  
 Slump, 1417  
 Slump flow, 1199  
 Small-angle neutron scattering, 2297  
 Smeared cracking, 495  
 Sodium sulfate, 1613  
 Softening, 1025  
 Soil, 1275  
 Solubility, 1499  
 Speciation modeling, 1057  
 Spectroscopy, 447, 581, 857, 991, 1499, 1521  
 Stability, 185, 219, 341, 869, 917, 1591, 1823, 2203, 2261  
 Stability, Deformation, 1189  
 Standard deviation, 745  
 Steel corrosion, 695  
 Steel fibers, 2215  
 Stochastic model, 745  
 Strength, 267, 283, 349, 521, 651, 1307  
 Strength development, 31, 81, 2319  
 Stress–strain relation, 789  
 Structural transition, Friedel's salts, 1845  
 Structure, 1943  
 Sulfate, 2079, 2245  
 Sulfate attack, 373, 759, 1087, 1297, 1579, 1599, 2103  
 Sulfate-resistant cement, 373  
 Sulfoaluminate, 807  
 Superplasticizers, 977, 1417, 2097  
 Supersaturation, 1613
- Surface area, 447, 1933, 2297  
 Surface coating, 1189  
 Sustainable development, 1489  
 Synchrotron radiation accelerator, 615  
 System boundary, 1313  
 System CaO–SiO<sub>2</sub>–H<sub>2</sub>O, 1529
- Temperature, 207, 275, 789, 1007, 1219, 1675  
 Tensile properties, 487, 1229  
 Tensile strength, 373  
 Ternary blends, 1561  
 Thaumassite, 1297, 1599  
 Thermal analysis, 299, 455, 927, 1795, 1845, 1873, 2057  
 Thermal conductivity, 845  
 Thermal decomposition, 703  
 Thermal energy storage, 927  
 Thermal treatment, 439, 557, 717, 849  
 Thermodynamic calculations, 1521, 1591  
 Tobermorite, 1251  
 Transport properties, 19, 43, 51, 119, 421, 481, 907  
 Triaxial mechanical behaviour, 1131  
 Tribometer, 821  
 Type of cement, 1579  
 Type V, 1275
- Ultrasonic pulse velocity, 631  
 Ultrasonics, 1185  
 Ultrasound, 563, 1451  
 Ultrasound pulse velocity, 2329
- Vibration, 219, 2141  
 Volcanic ash, 695  
 Volcanic pumice, 283
- Waste catalyst, 759  
 Waste concrete, 1307  
 Waste glass, 267  
 Waste management, 109, 149, 341, 557, 677, 941, 957, 1103, 1173, 1229, 1899, 1927, 1975, 2079, 2181, 2203, 2309  
 Waste tire, 2283  
 Water/cement ratio, 1579  
 Water leaching, 1569  
 Water-to-binder ratio, 977  
 Water-to-cement ratio, 721  
 Water-to-solid weight ratio, 623

|                                       |                                        |                        |
|---------------------------------------|----------------------------------------|------------------------|
| Weathering resistance, 753            | X-ray absorption fine structure (XAFS) | X-ray diffraction, 299 |
| Wedge-splitting test, 507             | spectroscopy, 1243                     | XRD, 299               |
| Wick action, 907                      | X-ray diffraction, 91, 581, 657, 949,  |                        |
| Workability, 207, 219, 235, 267, 363, | 1051, 1243, 1297, 1481, 1541,          | Zeolite, 731, 949      |
| 399, 409, 671, 1307, 1373, 2015,      | 1599, 1683, 1725, 1823, 1845,          |                        |
| 2021                                  | 1873, 2029, 2079                       |                        |