

# Index

- activated charcoal powder 30
- active sites 29, 35, 69, 70, 102, 105, 112, 121, 136, 143, 248, 250
- adhesion 6, 13, 32, 81, 87, 98, 120, 121, 145, 175, 187, 251
- adsorption 36, 100, 108, 114, 139, 140, 143, 146, 167, 242
- alloy 147, 172
- alternative material 22, 24, 26, 99, 164, 187
- annealing 51, 136, 141, 153, 238
- anode 1, 2, 98, 168, 203, 226, 227
- approach
  - bottom-up 236, 237,
  - chemical synthesis 135
  - energy production 16
  - top-down 236
- arc discharge 167, 169, 170, 203, 204
- atmosphere
  - carbon-bearing gas 70
  - inert 135
  - inert gas 203, 206
  - vacuum 28
- Bader charge analysis 143
- bandgap 22, 24, 37, 44, 133, 134, 233–236, 244
  - size-dependant 231, 234
  - tunable 76
- BET method 36
- bulk semiconductor 230, 231, 236
- capacitance 31, 103, 106, 107, 121, 132
- carbide 65, 69–72, 131, 164
- carbon 3, 6, 7, 10, 65, 71, 77, 164, 165, 167, 169, 170, 201, 204
  - activated 3, 77, 98, 164, 173, 187
  - nitrogen-doped 70
- carbon cloth (CC) 145–147
- carbon material 3–5, 11, 65, 89, 98, 164–166, 251
- carbon nanofiber (CN, CNF) 69, 76, 199–211, 213–218
- carbon nanostructure 98, 99, 187
- carbon nanotube (CNT) 3, 6, 10–16, 82, 84, 85, 98, 100, 101, 164–187, 202, 207
- carbon source 69, 169, 172
- carboxyl methyl cellulose (CMC) 180, 181
- catalysis 3, 50, 77, 104
- catalyst 3, 4, 6, 31, 33, 35, 37, 42, 113, 114, 131, 164, 167–169, 171, 172, 174, 200, 201, 205
- catalytic activity 37, 39, 51, 99, 101, 106, 110, 112, 121, 132, 133, 218, 244, 247, 249, 251
- catalytic material 4–6, 77, 131, 141, 148, 228
- catalytic property 15, 21, 22, 29, 33, 100, 106, 108, 121, 123, 230, 240
- cathode 2, 98, 168, 203, 226
- CBD *see* chemical bath deposition
- CC *see* carbon cloth
- cell 1, 4–6, 10, 14–16, 24, 81, 86, 103, 108, 109, 132, 176, 181, 226–229
  - electrochemical 3, 4, 130, 226, 227

- flexible 207
- photovoltaic 64, 129, 244
- symmetrical 34, 46, 49, 104, 152
- cell performance 16, 89, 98, 102, 130, 140, 207, 247
- chalcogenides 26, 112, 130, 131, 133, 142, 143, 148, 152, 153, 155, 246
- charge transfer 46, 51, 132, 176, 184, 250
- charge transfer overpotential 4, 5, 228
- charge transfer resistance 79, 98, 102, 114, 121, 132, 179, 181–184, 207, 213, 228
- chemical bath deposition (CBD) 136, 140, 241–243
- chemical vapor deposition (CVD) 12, 28, 151, 152, 154, 167, 170–172, 174, 177, 199, 202, 204, 205, 208, 237
- CMC *see* carboxyl methyl cellulose
- CN *see* carbon nanofiber
- CNF *see* carbon nanofiber
- CNT *see* carbon nanotube
- conducting polymer 23, 29, 37, 65, 77, 98
- conducting substrate 4, 5, 87, 99, 145, 228
- conductivity 4, 5, 10–12, 15, 29, 31, 32, 35, 37, 39, 100–102, 118, 121, 165, 166, 244, 247
  - ionic 84, 228
  - thermal 78
- constant phase element (CPE) 30, 32, 83, 88, 104, 106, 109, 120, 138, 139, 214
- conversion efficiency 3, 64, 66–71, 76, 77, 99, 102–104, 107, 108, 114, 184, 185, 207, 208, 213, 216, 225, 228
- corrosion resistance 3, 4, 6, 10, 24, 227
- counter electrode 1–11, 13–16, 21–24, 26, 75–77, 97, 98, 113, 114, 121–123, 129–132, 152, 153, 155, 163–165, 176, 177, 179, 185–187, 199, 200, 206–217, 225–227, 229, 230, 245–251
  - alternative 82
  - carbon nanofibers 213
  - chalcogenide-based 120
  - CNT 13, 182
  - graphene 16
  - hybrid 210
  - metal sulfide 99
  - MnO<sub>2</sub>-based 43
  - Pt 3, 9–11, 101, 108, 113, 114, 207, 210
  - telluride-based 152
  - titanium-based 89
- CPE *see* constant phase element
- crystal growth 27, 108, 238
- crystal structure 37, 38, 105, 116, 134, 141, 143, 152
- CV *see* cyclic voltammetry
- CVD *see* chemical vapor deposition
- cyclic voltammetry (CV) 8, 41, 43, 100, 106, 109, 110, 112, 114–118, 120, 123, 144, 146–148, 184, 186, 250
- defects 12, 22, 117, 140, 171, 172, 174, 232
  - chemical 167
  - elementary 117, 118
  - structural 171
- deposition 30, 46, 137, 144, 154, 168, 243
  - arc 167
  - chemical bath 136, 140, 241
  - dense 241
  - electrochemical 9, 136, 229, 242
  - electrochemical atomic layer 144

- electrophoretic 12
- potentiodynamic 102
- selective 204
- sputter 229
- device 63, 64, 68, 71, 99, 100, 104, 120, 136, 140, 141, 153, 155, 181, 182, 184, 186, 187, 251
- champion 248
- conventional 141
- electrochemical 201
- electronic 201
- energy conversion 64
- glass-based 207
- optoelectronic 152
- photonic 1
- solar cell 185
- diffusion 8, 105, 110, 111, 132, 236, 248
- dip pen lithography 237
- dispersion 44, 175, 176, 182–184
- drop-casting technique 249
- DSSC *see* dye-sensitized solar cell
- dye 2–6, 21, 22, 24, 64, 117, 131, 132, 163, 164, 200, 211, 227, 246
- dye molecule 1, 98, 226, 229, 245
- dye regeneration 7, 109, 135
- dye-sensitized solar cell (DSSC) 1–16, 21–24, 28–40, 48–52, 63–72, 75–77, 79–89, 97–103, 107–117, 119–123, 129–132, 135, 136, 140–142, 147, 148, 163, 164, 176–187, 199, 200, 210–218, 225–230, 244–251
- ECN *see* electrospun carbon nanofiber
- EIS *see* electrochemical impedance spectroscopy
- EIS Nyquist plot 30, 32, 35, 45
- EIS spectrum 106, 119, 120
- electrical conductivity 3, 6, 10, 30, 31, 35, 37, 50, 51, 69, 89, 103, 105, 106, 164, 166, 249
- electrocatalyst 11, 46, 65, 66, 69, 71, 72, 135, 142, 145, 148, 246, 250
- electrocatalytic activity 10, 12, 30–32, 39, 66, 69, 77, 79, 106, 109, 111, 117, 118, 140, 141, 181, 182, 247, 248
- electrocatalytic properties 14, 65, 82, 113, 114, 186, 228, 249
- electrochemical catalytic activity 29, 42, 99, 104, 117, 249
- electrochemical impedance spectroscopy (EIS) 6, 7, 30, 31, 99, 109, 110, 112, 113, 118, 120, 123, 147, 152, 210, 213, 245
- electrochemical stability 50, 51, 112, 118, 145, 248, 249
- electrode 1–4, 7, 8, 76, 102–104, 106, 108, 112, 114, 150, 153, 167, 168, 206, 207, 226, 227, 229, 242, 243
- catalytic 12
- champion 142
- fabricated 69
- fiber 145
- photovoltaic 4
- transparent 241, 242
- electrolyte 1–5, 21–24, 45, 46, 66, 76, 77, 86, 99, 100, 102, 105–107, 132, 155, 163, 164, 200, 207, 208, 211, 228–230, 244–246
- bulky 103
- iodide-based 4, 118
- iodine-based 109, 130
- iodine/iodide 164
- non-corrosive 76
- organic 76
- oxidized 77, 229
- thiolate 37
- triiodide 8, 37
- trioxide 122
- electron beam lithography 237

- electron transfer 8, 13, 14, 99, 132, 136, 145, 248
- electron transport 22, 24, 39, 45, 70, 99, 145, 201, 250
- electrospinning 66, 69, 175, 199, 202, 206, 208, 209, 213, 214, 216
  - coaxial 216
  - concentric 207, 209
- electrospun carbon nanofiber (ECN) 207–211, 215
- energy conversion efficiency 9, 11, 13, 15, 207, 208, 210, 249
- energy level 4, 8, 24, 89, 227, 231, 232, 234, 239
- excitons 231, 233, 234
  
- Faraday's constant 132, 229
- Fermi level 2, 5, 102, 227
- film 1, 10, 11, 49, 69, 85, 102, 106, 113, 117, 118, 120, 131, 185
  - binder-free CNT 181
  - coated carbon 136
  - compact 244
  - layered 106
  - mesoporous CoS 102
  - MoS<sub>2</sub> 107
  - nanocomposite 175
  - nanocrystalline 114
  - post-annealed 140
  - spray-coated 211
  - sulfide 246
  - sulfurized 117
  - thin 1, 28, 49, 50, 103, 104, 108, 152, 204, 237
- fluorine-doped tin oxide (FTO) 2, 4, 101, 102, 105–107, 132, 137–139, 141, 145, 179, 182, 183, 185, 208, 211
- free-standing graphene 141
- FTO *see* fluorine-doped tin oxide
- FTO substrate 6, 106, 120, 136, 145, 182, 183, 211, 248–250
  
- fullerene 164, 165, 203
- furnace 142, 153, 166, 169, 172
  
- GC *see* graphitic carbon
- GN *see* graphene nanosheet
- GQD *see* graphene quantum dot
- graphene 10, 15, 16, 29, 50, 53, 98, 131, 134, 136, 164, 165, 173, 174, 181, 247, 249
- graphene nanosheet (GN) 10, 37, 53
- graphene quantum dot (GQD) 247–249
- graphite 3, 133, 164, 165, 169, 171, 203, 204
- graphitic carbon (GC) 70, 71, 200
- greenhouse effect 17
  
- Hall measurements 116, 117
- highest occupied molecular orbital (HOMO) 2, 231
- holes 4, 24, 35, 204, 229, 230, 232, 234, 235
- HOMO *see* highest occupied molecular orbital
- hydrothermal method 27, 28, 35, 45, 216, 250
- hydrothermal reaction 216, 229, 249
  
- IER *see* ion exchange reaction
- ion exchange reaction (IER) 101, 102
  
- laser ablation 167, 169–172
- lowest unoccupied molecular orbital (LUMO) 2, 231
- low-pressure chemical vapor deposition 208
- LUMO *see* lowest unoccupied molecular orbital
  
- MC *see* mesoporous carbon
- mediator 4, 5, 98, 102, 132, 227

- mesoporous carbon (MC) 3, 31, 42, 43, 67, 77, 164
- metal carbides 23, 26, 65, 71, 72
- metal chalcogenides 23, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 246
- metal oxides 22–27, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51–54, 65, 68, 130, 131
- metal sulfides 23, 65, 99, 141, 230, 246
- metal tellurides 247
- methane 170, 172, 200, 201, 204, 205
- MLA *see* molecular linker attachment
- molecular beam epitaxy 237
- molecular linker attachment (MLA) 242, 243
- molybdenum 72, 90, 142, 214
- molybdenum disulfide ( $\text{MoS}_2$ ) 15, 106–108, 122, 131, 135–136, 140, 153, 155, 246
- molybdenum nitride ( $\text{MoN}$ ) 15, 76, 77, 81–84
- molybdenum selenide ( $\text{MoSe}_2$ ) 131, 134, 135, 142–144, 146, 155
- $\text{MoN}$  *see* molybdenum nitride
- morphology 22, 24, 33, 39, 44, 99, 100, 105, 106, 108, 114, 117, 118, 135
- $\text{MoS}_2$  *see* molybdenum disulfide
- $\text{MoSe}_2$  *see* molybdenum selenide
- multi-walled CNT (MWCNT) 11–16, 31, 32, 53, 136, 154, 165, 173, 174, 177–186
- MWCNT *see* multi-walled CNT
- nanocrystal 109, 148, 149, 234, 235, 238, 239
- nanofiber 44, 66, 100, 201, 210
- nanoflower 45, 47, 114, 143, 144
- nanoparticle 2, 35, 36, 99, 113, 114, 141, 213, 215, 230, 240, 244
- cobalt-titanium carbide 216
- CuNi bimetallic 210
- metal 172
- spherical 114, 116
- titanium carbide 69
- nanorod 37, 39, 42, 52, 66, 68, 114, 116
- nanosheet 46, 100, 104, 114, 136, 153, 244
- Nernst diffusion 132, 228
- Nernst diffusion impedance 46, 79, 105, 106
- Nyquist plot 6, 7, 30, 34, 46, 49, 79–81, 83, 85, 87, 88, 139, 144, 149, 153
- oxidation 2, 29, 33, 42, 46, 101, 103, 106, 110, 111, 226, 234
- Pauli's exclusion principle 232
- PCE *see* power conversion efficiency
- PDOS *see* projected density of states
- PEDOT *see* poly(3,4-ethylenedioxythiophene)
- photoanode 1, 5, 21, 22, 64, 98, 109, 113, 200, 226, 228, 245, 246
- photocurrent 84, 85, 130, 245
- photocurrent density 24, 48, 49, 87, 103, 109, 150, 227, 245
- photon 230, 231, 233
- photosensitizer 2, 229, 244, 245
- photovoltaic performance 76, 81, 84, 88, 103, 105, 109, 111, 112, 163, 164, 181, 183–186, 208, 213
- physical vapor deposition (PVD) 9, 28, 237

- plasma-enhanced chemical vapour deposition 172
- platinum 2–5, 21, 22, 30, 75, 78, 89, 90, 98, 164, 216, 217, 225, 226, 229
- poly(3,4-ethylenedioxythiophene) (PEDOT) 14, 30–32, 37–39, 41, 50, 53, 85, 87, 182–184, 187, 251
- poly(styrenesulfonate) (PSS) 14, 31, 32, 37–39, 41, 53, 85, 87, 183, 184
- polymer 3, 23, 164, 175, 176, 182, 187, 230
  - conductive 5, 89, 187, 251
  - excess 185
  - thermoplastic 175, 176
- power conversion efficiency (PCE) 29–33, 35, 37, 39, 42, 46, 50–54, 66, 68, 69, 76, 77, 79–82, 84–86, 130, 131, 135, 136, 140, 141, 143–145, 152–154, 179–184, 213, 214, 216
- precursors 27, 28, 65, 69, 109, 206, 212, 237, 238
  - anionic 241
  - carbon powder 168
  - cationic 241
  - polymeric 206
  - salt 242
  - toxic 28
  - volatile 28, 204
- projected density of states (PDOS) 143, 146
- PSS *see* poly(styrenesulfonate)
- PVD *see* physical vapor deposition
- QD *see* quantum dot
- QDSC *see* quantum dot-sensitized solar cell
- quantum dot (QD) 76, 230, 231, 234, 236–238, 241–243
- quantum dot-sensitized solar cell (QDSC) 76, 77, 244
- quantum yield (QY) 233–235
- QY *see* quantum yield
- Raman scattering measurements 250
- reaction 4, 5, 42, 46, 104, 105, 110, 114, 132, 150, 167, 168, 228, 229, 241, 242
  - chemical 28, 113, 166, 240
  - elementary electrode 132, 229
  - endothermic 29
  - ion exchange 101
  - kinetic 136
  - neutralization 25
  - one-step solvothermal 145
  - reduction 4, 29, 41, 77, 111, 228, 229
  - reversible 9
  - two-electron 147
- reactive ion etching 185, 237
- redox couple 4, 5, 41, 42, 46, 65, 67, 68, 76, 100, 105–107, 115, 120, 225, 228
  - iodide-free 68
  - iodine iodide 164
  - polysulfide 77
  - reversible 8
- redox electrolyte 12, 64, 66, 76, 120, 135, 208
  - iodine-free 64, 72
- redox mediator 5, 8, 131, 132
- redox reaction 70, 87, 102, 106, 109, 110, 115, 117, 182, 187, 211, 213
- redox shuttle 64, 112
- redox species 4, 5, 98, 131, 132, 164, 184, 234
- reduced graphene oxide (rGO) 10, 31, 35, 44, 48–50, 53, 80, 81, 249, 250

- reduction 3–6, 11, 12, 33, 39,  
42, 50, 51, 64–67, 70–72,  
100, 105, 106, 109–113, 118,  
120, 207, 209, 210, 226–229,  
247–249
  - chemical 229
  - fastening 186
  - mediator 228
  - polysulfide 250
- resistance 24, 46, 103, 132, 164,  
181, 227, 228, 240
  - chemical 25
- resistivity 104, 116–118, 120, 174
- rGO *see* reduced graphene oxide
- selenides 65, 116, 142, 246
  - binary 142
  - layered 142
  - ternary-based 147, 148
  - tungsten 131, 142
- selenization 142, 144, 146, 154
- semiconductor 2, 130, 132, 133,  
155, 234, 236, 237, 244, 245
- sensitizer 1, 4, 8, 64, 76, 77, 82, 85,  
98, 131, 132, 142, 200
- short-circuit current density 4, 16,  
117, 132, 207, 211
- SILAR *see* successive ionic layer  
adsorption and reaction
- single-walled CNT (SWCNT)  
11–13, 16, 29, 35, 165, 169,  
171, 173, 174, 176, 177, 180,  
181
- solar cell 10, 21, 22, 63, 64, 75, 77,  
97, 129–131, 142, 147, 163,  
164, 172, 174, 200, 208, 228,  
243, 244, 249
- solar energy 21, 63, 64, 75, 97, 98,  
217
- solvothermal method 27, 28, 37,  
45, 46, 141, 214
- spray pyrolysis 243
- sputtering 9, 152, 202, 237
- Stokes shift 233
- substrate 12–14, 28, 98, 99, 137,  
141, 142, 146, 147, 172, 175,  
179, 181, 183, 242, 251
  - flexible 104, 164
  - flexible plastic 98
  - low conduction 11
- successive ionic layer adsorption  
and reaction (SILAR)  
241–243, 245
- sulfurization process 136, 140,  
141
- sunlight 2, 4, 6, 22, 24, 64, 66, 98,  
200, 227
- surfactants 27, 148, 175, 238, 243
- SWCNT *see* single-walled CNT
- synergetic effects 67, 100, 248,  
249, 251
- Tafel analysis 120
- Tafel polarization 109, 112, 118,  
119, 186
- TCO *see* transparent conductive  
oxide
- temperature programmed reaction  
65
- thermal conductivity 98, 152, 166,  
173
- thermal decomposition 9, 27, 29,  
141, 229
- thermally exfoliated graphene 10
- TM *see* transition metal
- TMC *see* transition metal carbide
- TMO *see* transition metal oxide
- transition metal carbide (TMC) 23,  
64–72, 77, 112, 251
- transition metal oxides (TMO) 25,  
26, 77
- transition metals (TM) 3, 25, 133,  
172
- transparent conductive oxide  
(TCO) 4, 24, 98, 173, 227, 228
- vanadium nitride (VN) 76, 77,  
79–82, 84

van der Waals force 142, 165  
vapor-grown carbon fiber 201  
Vegard's law 236  
VN *see* vanadium nitride

Warburg impedance 132  
Warburg parameter 132, 228

Young's modulus 135, 173



Renewable energies have become an attractive option to overcome the energy demands in sustainable and affordable ways. It has been estimated that one-third of the total renewable energies would be generated from photovoltaics (PVs). A solar or PV cell is a device that directly converts sunlight into electricity by taking benefit of the photoelectric effect. In the third-generation solar PVs, dye-sensitized solar cells (DSSCs) are believed to be the most promising and have attracted wide attention. The optimization of a DSSC is focused on four main components: (i) metal oxide semiconductor, (ii) photosensitizer, (iii) redox couple electrolyte, and (iv) counter electrode. Among these, the counter electrode undertakes three functions: (i) as a catalyst, (ii) as a positive electrode of primary cells, and (iii) as a mirror. To obey these functions, the electrode material should have high catalytic activity, high conductivity, high reflectivity, high surface area, and electrochemical and mechanical stability. To improve the performance of DSSCs, many scientists have developed new counter electrodes made of platinum, carbon materials, transition metals, conductive polymers, and composites. This book converses the various aspects of materials for the fabrication of counter electrodes especially for the DSSCs.



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