

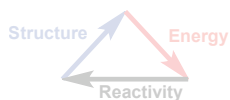
Index:

Acid-base reactions, 224
 Acid dissociation constant (K_a), 415
 Activated state (i.e. Transition state, TS), 325, 331
 Activation energy, 331
 Acyclic (i.e. chain), 248
 Alkanes, 247
 Allylic tetrahedral atoms, 86
 Angular momentum quantum number (l), 5
 Anti-bonding molecular orbital, 147, 150
 Anti-bonding orbital interactions, 150
 Anti-conformation, 184
 Anti-orientation, 50
 Anti-periplanar, 252
 Anti-staggered, 253, 254
 Antigen or substrate, 223
 Arrhenius, 324
 Atom connectivity, 42
 Atomic orbitals, 147
 Atomic representation, 4
 Atom size, 418
 Aufbau, 152
 Aufbau principle, 6
 AXE notation for Lewis structures, 23, 24, 25
 Axial orientation, 268-271
 Azimuthal quantum number (l), 5
 Basic kinetic steps for free radical reaction, 358
 BDE (i.e. Bond Dissociation Energy), 329, 331
 BDE and homolysis temperatures, 364
 BDE selected homolysis of C-H bonds, 361
 BDE selected homolysis of X-Y bonds, 363
 Bell, Evans, and Polanyi (BEP), 330
 Benzylic tetrahedral atoms, 86
 BEP and selectivity of radical reactions, 380-383
 Boat conformation or conformer, 264
 Bohr atomic model, 135
 Boltzmann distribution of gas velocities, 326
 Boltzmann's distribution law, 250
 Bond angle deformation, 262
 Bond angle strain, 257
 Bond dipole, 41
 Bond dipoles, 12
 Bonding orbital (bonding interaction of orbitals), 150
 Bonding triangle, 14
 Bond order (B.O.), 154

Bond strength for multiple bonds on a per bond basis, 136,137
Bp (boiling point), 305
Bridgehead radicals, 374-375
Brønsted-Lowry (BL) acids and bases, 410
Butane conformations, 252-254
Cahn, Ingold and Prelog (CIP), 201
Chain conformations, 249
Chain types, 248
Chair and boat cyclohexane conformers, 185
Chair conformation or conformer, 264
Chemical reactions and thermodynamic states, 327
Chemical reactions at stereogenic centers, 231
Chemical reactions next to stereogenic centers, 232
Chemistry definition, 323
Chiral carbon center, 188
Chiral molecules, 189
CIP notation and notational rules, 196, 199-205
Common or trivial names for organic molecules, 92, 93
Condensed notation, 43
Configurational isomers, 187
Conformational analysis, 247
Conformational isomers, 183
Conformations (i.e. conformers), 247
Conjugate acid, 413, 415
Conjugate base, 413, 415
Conjugated unsaturation, 84, 85
Conjugation, 27, 28
Constitutional isomers, 178, 179
Constructive interference, 143, 145,150, 152
Coulombic (ion-ion) interactions, 293
Covalent bonding, 12
Covalent interaction ($2e^-$), 153
Covalent interaction ($4e^-$), 153, 154
CRHIS acronym for evaluation of acidity, 430
Cumulated unsaturation, 84, 85
Cyclic (i.e. ring), 248
Cyclobutane conformations, 266, 267
Cyclohexane conformations, 261, 264
Cyclopentane conformers, 265-266
D-(+)-glyceraldehyde and L-(-)-glyceraldehyde, 196
D-(-)-tartaric acid and L-(+)-tartaric acid, 194
D and L vs d and l, 196
Darling model, 49
DARP (i.e. Distance Along Reaction Path), 327
Degree of unsaturation, 182
Delocalization (i.e. resonance) effects on acidity, 425, 426-428
Delocalization, 27

Destructive interference, 143, 145, 150, 152
Detergent, 306
Diastereomeric salts and isomer resolution, 225-228
Diastereomers or diastereomeric, 187, 198, 221, 222
1,3-diaxial interactions, 271
Dihedral angle, 184
Dihedral angle, 251
Dipolar aprotic solvents, 429
Dipole-Dipole alignment geometries, 295
Dipole-Dipole interactions, 291, 294
Dipole-induced dipole interactions, 291
Direct equilibrium (reactants-products), 441
Direction of plane polarized light rotation (+ or d) and (- or l), 190
Direction of wave displacement (i.e. propagation), 138
Dispersion (i.e. London) interactions, 291
Dominant HOMO-LUMO interaction, 468, 469
Dynamic equilibrium, 250
Eclipsed conformation, 249, 254
Electron, 3
Electron affinity, 434
Electron availability and acceptor strength, 298
Electron distribution, 23, 24
Electronegativity (EN), 9, 10, 11
Electronegativity (EN) for Main Group elements, 412
Electronegativity and acid strength, 419
Electronegativity and H-bond strength, 297
Electron flow, 439
Electron flow or shift arrows, 442, 443
Electronic geometries for carbon atoms, 79
Electronic geometry, 19, 23, 24
Electronic geometry of a methyl radical, 373
Electron wave, 135
Electrophile, 431, 435
Elementary reactions, 339-340
Enantiomeric or enantiomeric isomers, 189
Enthalpy of intermolecular H-bonds vs intramolecular H-bonds, 297
Enthalpy of vaporization ($\Delta H_{0\text{vap}}$), 305
Entropy, 249
Entropy of intermolecular H-bonds vs intramolecular H-bonds, 297
Epitope or receptor site, 223
Equatorial orientation, 268-271
Equilibrium arrows (types), 440
Equilibrium constant, 414
Ethane conformations, 249
First ionization potential, 411
First ionization potential as a function of atomic number, 411
Fischer projection, 51

FMO (i.e. Frontier Molecular Orbital or Orbitals), 467
FMO reciprocity, 474
Formal Charge (FC), 16
Formal charge on a methyl radical, 373
Four electron (4e-) bonding interaction, 464
Free energy of intermolecular H-bonds vs intramolecular H-bonds, 297
Functional group (FG), 71, 73, 75, 76
Gauche, 254
General characteristics of chemical reactions, 324
Geometrically directed orbitals, 164,165
Ground State or ground state electron configuration, 6, 9
H-bond acceptors, 295, 297
H-bond donors, 295, 297
H-bond interactions, 291, 295
H-bond intermolecular, 296
H-bond intramolecular, 296
H-bond types, 296
H-X bond strength and acidity, 418
Half chair conformation or conformer, 264
Hammond Postulate, 334-337
Haworth representation, 52
Heat of combustion, 258
Heterodiatomic, 15
Heterolytic bond cleavage, 359,360
HOMO (i.e. Highest Occupied Molecular Orbital), 465
Homodiatomic, or Homonuclear diatomic, 15
Homolytic bond cleavage (i.e. homolysis), 359
Hot vs cold radicals and selectivity, 383-387, 395-398
Hund's rule of maximum multiplicity, 6, 152
Hybridization, 163
Hybridization effects on acidity, 425
Hydrophilic, 306
Hydrophobic, 306
IMF vs Chemical bonds, 288-290
In-phase orbital overlap, 150, 469
Index of hydrogen deficiency (IHD), 181
Index of refraction, 190
Induced dipole-induced dipole (i.e. dispersion or London) interactions, 291, 299-302
Inductive effects (electron donating or +I), 423
Inductive effects (electron withdrawing or -I), 423
Inductive effects, 419-424
Inhibitor, 371
Initiation (i.e. radical initiation), 358, 373
Inter-orbital angles vs atom based bond angles, 263
Interference of waves, 143
Intermediate or reaction intermediate, 341-342
Intermediates in Organic Chemistry, 344



Intermolecular forces (IMF), 287
Introduction to IUPAC nomenclature rules, 94-113
Inversion of configuration, 232
Ion-dipole interactions, 291, 293
Ion-induced dipole interactions, 291
Ion-ion (i.e. coulombic) interactions, 293
Ionic bonding, 12
Ionization energy, 9
Ionization potential, 435
Irreversible reaction arrows, 441
Isolated unsaturation, 84, 85
Isomerism, 178
Isomers or Isomeric, 178
IUPAC names for alkane chains, 89
IUPAC names for benzene derivatives, 116-123
IUPAC short-cut names, 91
Kekule representational notation, 44
Kinetic vs Thermodynamic control, 337-339
Lactic acid, 189, 190
Lewis acid-base reactions, 438, 439
Lewis representational notation, 44
Lewis structure, 15, 16, 17
Lewis structure limitations, 136
Lewis theory of acids and bases, 412, 431-432
Line-angle representational notation, 45
Liposome (i.e. proto cells), 306, 307
Lock and key (Fischer's mechanism for catalysis), 341
London or dispersion (i.e. induced dipole-induced dipole) interactions, 291, 299-302
LUMO (i.e. Lowest Unoccupied Molecular Orbital), 465
Magnetic quantum number (Ml), 5
Main Group Element, 4
Main Group elements, 410, 411
Maximum number of stereoconfigurations (2^n), 229
Meso or meso structure, 195
Metallic bonding, 11
Metallic elements, 410
Methamphetamine, 223-224
Micelle (i.e. normal micelle), 306
Molecular Orbital Diagram for Carbon atoms, 160
Molecular orbital energy, 149
Molecular orbitals, 147
Molecular orbital theory, 137, 147
Molecular shape, 23, 24, 25
Mp (melting point), 305
Net molecular dipole, 41
Net overlap or net orbital overlap, 151, 156
Neutron, 3

Newman projection, 51, 187
Newman projection -How to draw, 57
Noble Gas, 9, 10
Nodal planes, 146,148, 162
Nodes, 139, 141, 148, 162
Nomenclature Rules and syntax, 87-91
Non-metallic, 410
Non-superimposable mirror image, 189
Nonpolar covalent bond, 12,15
Nuclear atom, 3
Nucleophile, 431, 435
Occupied molecular orbitals, 465
Octet rule, 15
Optimal bond length, 155
Orbital interaction diagram, 151
Orbital nodes, 145
Orbital phases, 146, 147
Orientation quantum number (M_l), 5
Out-of-phase (i.e. destructive interference), 147,148,150
Out-of-phase orbital overlap, 469
Overlap geometry, 157, 158
Overlap geometry (π -), 159
Overlap geometry (σ -), 159
Oxidation number (OX), 20
Oxidation number effects on acidity, 425
Partial ionic character, 41
Pauli (spin rule), 152
Pauli exclusion principle, 6
Pauling electronegativity (EN), 9, 10, 11
Periodic Table or Mendeleev's Periodic Table, 8, 9
Periplanar, 252
Phase difference (wave train), 139
Phase transfer catalysts, 306
Photochemical initiation or generation of radicals, 366
Plane or molecular plane of symmetry or mirror plane of symmetry, 195
Plane waves, 137, 138
Point of first difference, 202
Polar covalent bonds or bonding, 12, 15, 41
Polarized light or plane polarized light, 190
Polar molecule, 41
Polycyclic rings-types, 124-126
Preliminary Lewis structure, 17
Principle of FMO narrowing, 467
Principle quantum number (n), 6,7
Priority of functional groups, 88
Propagation or propagation reactions, 358, 368, 373
Proton, 3

Puckered ring conformations, 185
Quantum numbers, 5
Quenching radical reactions, 371
Racemic mixture, 194
Racemization of carbon radicals, 377
Racemization of configuration, 232
Radical electronic geometry, 373
Radical initiation, 358
Rate determining reaction, 368
Receptor-substrate interaction, 221-223
Redox initiation or generation of radicals, 367
Regioselectivity, 235
Relative configuration, 196
Resonance (i.e. delocalization) effects on acidity, 426
Resonance, 27
Resonance hybrid interpretation, 427, 446
Restricted rotation, 167
Retention of configuration, 232
Ring conformations, 261
Ring strain, 257
Ring types, 248
Rotational isomers (i.e. rotomers), 247
Salt bridges, (ion-ion interactions), 293
Saturated carbon atoms, 180
Saturated hydrocarbons, 247
Sawhorse -How to draw, 55
Sawhorse representational notation, 50
Schrodinger wave model, 135,137
Schrodinger's orbitals, 147
Screening of electrons, 425
Self-sustaining radical reactions, 368
Skeletal representational notation, 45
Skeleton or skeletal motifs (R), 71, 73, 76
Skeleton types or classifications, 77
Soaps, 306
Solubility, 305
Solvation effects on acidity, 429-430
Spin quantum number (M_s), 5
Staggered conformation, 249, 251,253
Standing waves, 144, 145
Stereospecificity, 236
Stereogenic carbon center, 188
Stereoisomers, 178,179,183
Stereoselectivity or handed preference, 221, 235
Steric strain, 255
Strain, 250
Strain energy determination, 258

Strain free, 258
Structural abbreviations for hydrocarbons, 93
Substitution reaction, 358
Surface tension, 305,306
Syn-conformation, 184
Syn-orientation, 50
Syn-periplanar, 252
Syn eclipsed, 253, 254
Tartaric acid salts, 192
Taste receptors, 222-223
Template directed synthetic chemistry, 310
Termination or termination reactions, 358, 370
Tetrahedral carbon types, 80
Thermal initiation or generation of radicals, 365
Through bond inductive interactions, 419, 421-423
Through space inductive interactions, 419, 421-423
Torsional strain, 250
Transverse wave properties (amplitude (A), displacement direction, nodes and wavelength (λ)), 138
Transverse waves, 138
Traveling waves, 138
Twist boat conformation or conformer, 264
Two electron ($2e^-$) bonding interaction, 462, 463
Types of C-C unsaturation, 82, 83
Types of HOMO-LUMO interactions and effect on chemical reactions, 491
Unoccupied or vacant molecular orbitals, 465
Unsymmetrical ion solvation, 429
Valence electron configurations, 8
Valence electrons, 8
Van Arkel Triangle, 14
Van der Waals radii, 255
Van der Waals strain, 255
Vitamin B-12 or cobyrinic acid, 230
VSEPR theory, 16, 23
Wave-wave interactions, 139, 145
Wave amplitudes (A), 138
Wave phase (or phase difference), 139
Wave propagation, 138
Wave train, 140
Wedge-dash -How to draw, 56
Wedge-dash representational notation, 50

