Cheatography

Electrochemistry Cheat Sheet

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Oxidation Rules

Neutral Compound = 0 (NO -)	Ion= ion charge (w/ -)
+1 w/ non-metals (Hydrogen)	Oxygen usually -2, -1 in peroxide (H2O2)
-1 w/ metals (H)	Group 1A: always +1
Halogens: usually -1, positive w/ oxygen	Group 2A: always +2
F always -1	Monatomic Ions: made with one atom, same as their charges
EXAMPLE:	

Redox Equations

Reduction: gain of electrons	Oxidation: loss of electrons
e-: electron	OIL: oxidation is loss (of electrons)
RIG: reduction is gain (of electrons)	OIL as half reaction: Na > Na(+) + e-
RIG as half reaction: Cl + e- > Cl-	for oxidation: e- on right
for reduction: e- is on left	If OX # ^ it is OIL
EXAMPLE:	If OX # goes down it is RIG

Batteries

Definition: a series of voltaic cells that produces a voltage that is the sum of the voltages of the individual cells	Types
Dry Cell Battery: Typical AA, AAA, C, & D	Lead Storage: 12 V (6 cells that each provide 2V)
Anode: Zinc, Cathode: graphite, all immersed in KOH	Anode: Lead, Cathode: PbO2, all immersed in sulfiric acid
Advantage: cheap and small	must be recycled!
Disadvantage: not recharagable	to keep electrodes from touching, wood or glass fiber spacers are used
Recharagable Batteris: includes lithium ion, nickel-cadmium, and nickel metal hydride batteries	Voltage may vary as the H2SO4 is used, even after recharging
Built in or separate charger	Advantage: large voltage, can be recharged

Batteries (cont)

Advantage: rechar-gable	Disadvantage: heavy, expensive, takes up a lot of space
Disadv-antage: cost	Fuel Cells: 2H2(g) + O2 (g) > 2H2O(l)
	Hydrogen is oxidized, electrons used to create electricity
	Used in spacec-raft, too $$ for general use
	Adv: no recharge, only emission is water
	Dis: cost

Calcuating Cell Potential

Find correct half reactions on green sheet	Down reduction potential, oxidation more likely (more positive voltage)
Write down half reactions on paper along with voltage	
higher voltage is e red, flip other half reaction to make oxidation and change sign given on green sheet (write it backwards)	
Add the half reactions and voltages together (e- should cancel)	

Writing Half Reactions

Assign oxidation numbers	Ex: Zn + Cu2+ > Zn2+ + Cu
Put the atoms with changing oxidation numbers in a separate reaction	
Balance all atoms	
Balance charge by adding e- to more positive side	

Voltaic Cell

Cathode: site of reduction (gaining e-)	Neutral atoms make solid metal
Anode: sire of oxidation (losing e-)	Metal ions can usually dissolve in water
Definition: devices that use a chemical reaction to create electricity	Cell Notati-on/Diagram: two half reactions combined
	Ex: Zn(s)|-Zn2+(a-q)||Cu2+(-aq)|Cu(s)

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Published 5th April, 2018.
Last updated 5th April, 2018.