Introduction to redox reactions

I What is a redox reaction?

- oxidation and reduction occuring simultaneously

Reduction (oxidating agents)	Oxidation (reducing agents)	→ 其中一个条件符合就行
oxidation no# of an atom +	Oxidation no# of an atom?	
-O/+H	+0 / - H	
(e-in harf equ. RHS)	(05es e ⁻ (e ⁻ in holf equ. LHS)	\rightarrow R.A. $\xrightarrow{e^-}$ O.A.

2 Oxidation number

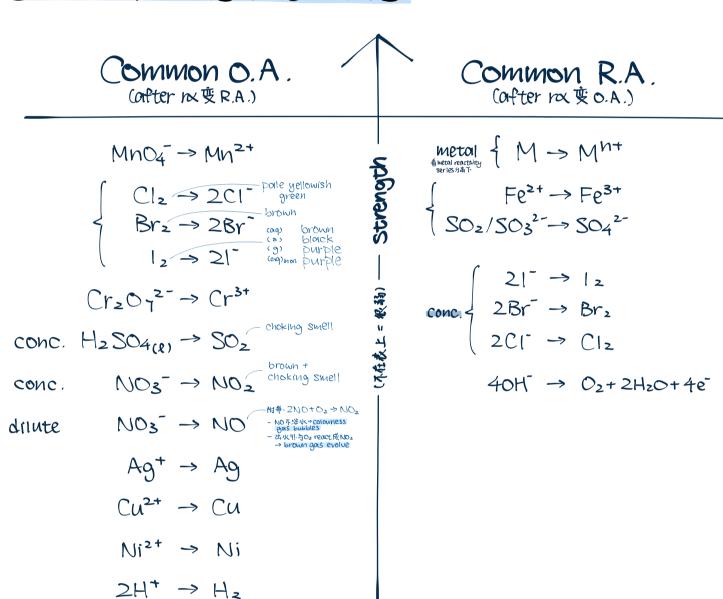
- (of an element in a compound) imaginery charge / charge an atom would have if it existed as an ion.
- Rules

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自己一个 ion: charge of ion Nat=+1, CI=-1
  Sum of all atoms in polyatomic ion: charge of ion MnO_4^- = -1 eg. find Mn exidation not x + 4(-2) = -1 x = +7
   sum of all atoms in element: 0 H20=0
> Oxygen
    → in compound:通常-2 H2O, ClO2
    -> exceptions > Na2Oz, K2O2, H2O2: -1
> Hydrogen
    \rightarrow w/ non-metal: +1 H_{\geq}0, HC1
    → W/ metal: -1 NorH
> Main grp metal
    \rightarrow in compound: +X (X=group noff) A|C|3
> Nitrogen
    \rightarrow max: +5' ]
        min:-3
             NO3: +5
             NO2: +3
             NO2: +4
               N: O
        NH3, NH4+: -3
   Sulphur
    → max: +6 } 相差=8
    \rightarrow SO_4^{2-}, SO_3: +6
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3 Common O.A.s and R.A.s

SO32; 302: +4

H2S: -2



4 Identify if reaction is redox SKILLS (MC)

-> X redox

... Not redox reaction

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    ✓ redox - oxidation number of X in XnY = ...
        oxidation number of X in X = ...
        oxidation number of X in X = ...
        ∴ there is change in oxidation number of X after reaction
        ∴ It is redox reaction.

    ✓ redox - There is no change in oxidation number of all atoms before & after reaction.
        Not redox reaction.
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1. 2Mn04^{2} + 5S03^{2} + 6H^{+} \longrightarrow 2MN^{2+} + 5S04^{2-} + 3H_{2}O
   判断 -> Rule 1: MnO4-, SO52-
         → V redox
   作档 → Oxidation number of Mn in MnO4=+7
            Oxidation number of Mn in Mn^{2+} = +2
            There is change in exidation number of Mn
            : It is redox reaction.
2. Clz + NaOH -> NaCI + NaOCI + H2O
    判断→ Rule 2/3: I non-metal element
             Rule 4: C12 → Nac1, Naoc1
         \rightarrow \vee redox
   作皆 → Oxidation number of Cl in Clz = O
            oxidation number of CI in Nacl = -1
                                                reason not
            Oxidation number of CI in NaOCI = +1 yet tanging
             There is change in oxidation number of CI
            I. It is redox reaction.
3. Cr_2O_7^{2-} + H_2O \rightleftharpoons 2CrO_4^{2-} + 2H^+
    判断→ (其他rule不合用,一定得算) Rule 6
            Cr2072-+ H20,= 2Cr042-+ 2H+
            ○与H的O.N.沒变, Cr不可能自己变(除非一变二/=变一)
    作智 → There is no change in oxidation number of all atoms before & after reaction
            .. Not redox reaction
4. Na2CO3 + 2HC1 -> 2NaC1 + CO2 + H2O
    判断→ Rule 5: Acid-base ra
         \rightarrow \times redox
   作皆 → There is no change in oxidation number of all atoms before & after reaction
            .. Not redox reaction
5. Pb(NO_3)_2 + 2NaC1 \rightarrow 2NaNO_3 + PbCl_2
   判断 → Rule 5: precipitation rx
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作皆 -> There is no change in oxidation number of all atoms before & after reaction