Balancing redox reactions and O.C.s

Half equation method

STEPS -- Half equ. = O.A., R.A. 各至的 ra, 有电子 - Full equ. = 两个harf equ. 结合在一起, 沒电子 - 四部曲 1 尺〇加水 | HALF □ 尺升加升* EQU. 3 加电子平衡电荷 在后两边的LCM加在一起} FULL EQU.

EXAMPLES

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1. MnO4+1
       5e+8+++2Mn04 -> Mn2++4H20
                     21- -512+20
     -> 16H++2MnO4+101->2Mn2++8H20+512
     -> Soln changes from purple to brown
2. (acidified) MNO4 cag, + FeSO4 cag,
       5e^{-} + 8H^{+} + MnO_{4}^{-} \rightarrow Mn^{2+} + 4H_{2}O
5e^{-} + 8H^{+} + MnO_{4}^{-} \rightarrow Mn^{2+} + 4H_{2}O
5e^{-} + 8H^{+} + MnO_{4}^{-} \rightarrow Mn^{2+} + 4H_{2}O
     \rightarrow SH^{+}+MnO4^{-}+5Fe^{2t}\rightarrow Mn^{2t}+4H_2O+5Fe^{3t}+5e^{-}
     -> Soln changes from purple to pale yellowish brown
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Common mistakes 1. Mn04-> Mn2+ 2. 写了SO42-作 R.A. (可是不在表上⇒很弱, Fe2t更强) 3. 写错 half equ. KMhO4→Mn²+→ 这是(aq), 要抓 Spectator fon FeSO4→ Fe3+ 如果是(s)((e), 则靠回部曲平衡

2 Change in O.N. method

STEPS

- 四部曲
 - □ 写O.N. (for 氧化素变了的 attoms)
 - □ 写每个element O.N.变了多少
 - 3 R.A., O.A. 式各至乘至 △o.N.的 LCM
 - ▼ 欠○カット,欠日か日*(不用平衡电荷)

EXAMPLES -

与conc. HNOs comp react 与反应产生水 > 把 HNOs comp 桥解 → HbSO4 (e) 可以!

1. CONC. NITTIC OCIO + Fe 安Fet unless specified → 不够使Fet南react变Fe3+ O.A. than Nos

- $4H^{+} + 2NO_{3}^{-} + Fe^{-} + NO_{2} + Fe^{2+} + H_{20}$
- \rightarrow 4H++2NO3+Fe \rightarrow 2NO2+Fe²⁺+H₂O Charge= 4(+1)+2(-1)+0=+2 Charge= 0+(+2)+0=+2
- -> brown fumes evolve Sol h changes from colourless to green
- 2. Cr2072-+ SO32-

- \rightarrow $8H^{+} + Cr_{2}O_{7}^{2} + 3SO_{3}^{2} \rightarrow 2Cr^{3} + 3SO_{4}^{2} + 4H_{2}O_{3}^{2}$
- -> soln changes from orange to green
- 3a. Potassium iodiate (KIO3) is mixed w/ potassium iodide to give 12.

$$12H^{+} + 210_{3}^{-} + 21^{-} \rightarrow 1_{2}^{-} + 5_{12}^{-} + 6H_{2}^{-}$$

- > 12H++2103+101->612+6H≥0
- 4 6H++105+51 → 312+3H≥0 -> Soln changes from colourless to brown
- 36. Sulphur is added to conc. H_SO4(1) to give SO2.

$$S + H_2SO_4 \rightarrow SO_2 + SO_2 + 2H_2O_4$$

- \rightarrow S+2HzSO₄ \rightarrow 3SO₂ + 2H₂O
- → Sulphur dissolves choking smell

0.01mol: 0.004 mol = 5:2

40.100cm³0.1M Sn²t reacts w/ 40cm³0.1M MnO4 completely. If MnO4 is reduced to Mn2+, write balanced equ. + O.C.

$$16H^{+} + 5Sn^{2+} + 2MnO4 \longrightarrow 5Sn^{2+} + 2Mn^{2+} + 8H_{2}O$$

- $\rightarrow 16H^{+} + 5Sn^{2+} + 2MnO_{4}^{-} \rightarrow 5Sn^{4+} + 2Mn^{2+} + 8H_{2}O$
- -> soln changes from purple to colourless.

If only 80 cm3 0.1M Sn2+ is added, state & explain 1 o.C.

-> purple colour intensity +/ purple colour becomes paler.

$$\rightarrow$$
 Sn²⁺ mol : MnO₄⁻ mol = 0.008 : 0.004
= 2:1 < 5:2

- : MnO4 is in excess, remaining MnO4 provides purple colour.
- :. Since [MnO4 cagi] decreases, colour intensity decreases.

0.1 mol: 0.04 mol = 5:2

46.200 cm3 0.05 M SO2 reacts W/ 20 cm3 0.2 M MnO4 completely. If SO2 oxidizes to become SOx2-, MnO4- reduces to become Mn2+, write balanced equ.

$$2H_{2}O + 5SO_{2} + 2MnO_{4} \rightarrow 5SO_{x}^{2-} + 2Mn^{2+} + 4H^{+}$$

$$+1x_{2} \rightarrow +1x_{3} \rightarrow +1x_{4} \rightarrow +1x_{4}$$

 \rightarrow 2HzO+5SO₂ + 2MnO₄ \rightarrow 5SO₄² + 2Mn²⁺ + 4H⁺