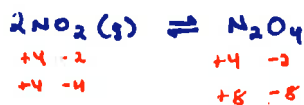


11/14

180 ipid

- Go over exam final grade replace
- Post Exam Survey
- Extended office hrs.

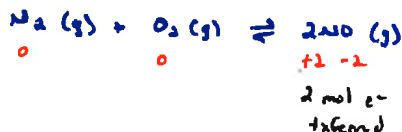
M 11-2  
T 10-12  
W 2-3  
R 10-12  
F 11-1



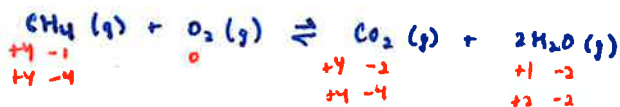
no change in oxidation state - not a redox rxn  
no transfer of e<sup>-</sup>



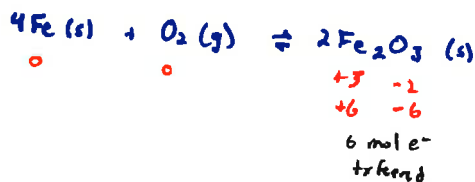
Redox rxn  
nitrogen reduced - gained e<sup>-</sup>  
oxygen oxidized - lost e<sup>-</sup>



oxygen reduced (oxidizing agent) oxidizer  
nitrogen oxidized (reducing agent)



oxygen reduced O<sub>2</sub> oxidizing agent  
hydrogen oxidized CH<sub>4</sub> reducing agent



oxygen reduced  
iron oxidized  
complex rxn

metal + oxygen → metal oxide  
usually in presence of H<sub>2</sub>O

### ELECTRON TRANSPORTATION / MOVEMENT

- e<sup>-</sup> has charge ∴ movement of charge → "electricity"
- ions have charge ∴ movement of charge →

Electric charge

defined as charge on a proton

$$1.602 \times 10^{-19} \text{ C}$$

Electric current

movement of charge (amp)  
(charge per second) I

$$A = \text{C s}^{-1}$$

Electric potential

force trying to move the charge (volt)  
(energy per unit of charge) V

$$V = \text{J C}^{-1}$$

$$V = IR$$

Faraday's Constant

charge (in C) per mole of e<sup>-</sup>

$$F = \frac{96,485 \text{ C}}{\text{mol e}^{-}}$$

So, for iron + oxygen example

2 mol e<sup>-</sup> transferred per mole of iron (s.s. of iron)

$$\text{charge transferred} = 2 \text{ mol e}^{-} \left( \frac{96,485 \text{ C}}{\text{mol e}^{-}} \right) = 1.93 \times 10^5 \text{ C}$$

0.06 kg iron rivets per day!

$$1.659 \times 10^{-8} \text{ mol Fe/sec}$$

$$\therefore 1.659 \times 10^{-8} \text{ mol Fe} \left( \frac{2 \text{ mol e}^{-}}{1 \text{ mol Fe}} \right) = 4.978 \times 10^{-8} \text{ mol e}^{-}/\text{s}$$

$$\text{so } \frac{4.978 \times 10^{-8} \text{ mol e}^{-}}{\text{s}} \left( \frac{96,485 \text{ C}}{\text{mol e}^{-}} \right) = 0.0048 \text{ A (C/s)}$$

current's time = charge  
(A) (s) (C)

$$\frac{0.0048 \text{ C/s}}{1.93 \times 10^5 \text{ C}} = 2.46 \times 10^{-8} \text{ s}^{-1} = \frac{\text{charge}}{\text{current}} = \frac{1.93 \times 10^5 \text{ C}}{0.0048 \text{ C s}^{-1}} = 4.06 \times 10^7 \text{ s} \approx 1.29 \text{ yrs.}$$

Assuming const current!