

# 7. BALANCING REDOX REACTIONS

UNIT 1 REACTIONS IN AQUEOUS SOLUTIONS  
CH40S  
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1

## BALANCING REDOX EQUATIONS

- Redox reactions are often quite complicated and difficult to balance because you must account for all the electrons as well as the atoms!
- The method we will use to balance redox reactions is called the Half Reaction Method.

2

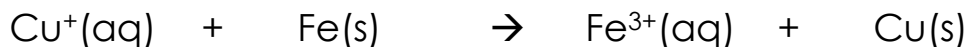
## THE HALF-REACTION METHOD:

1. Write the unbalanced net equation.
2. Split the equation into it's LEO and GER  $\frac{1}{2}$  reactions.
3. Balance all elements **except** "H" and "O".
4. Balance the "O's" by **adding water**,  $H_2O$ .
5. Balance the "H's" by **adding hydrogen ions**,  $H^+$ .
6. Balance the electric charge by **adding electrons**,  $e^-$ .
7. Multiply the two equations by appropriate coefficients to make the # of electrons in the equations equal.
8. Re-combine the two equations, canceling if needed.

3

## BALANCING NEUTRAL REDOX REACTIONS

Redox reactions that **don't** involve oxygen and hydrogen can be balanced fairly simply...



4

## BALANCING ACIDIC REDOX REACTIONS

Redox reactions that **do** involve oxygen and hydrogen are a different beast...



5

## WHAT IF IT'S BASIC?

Notice that the method has assumed the solution was **acidic** - we added  $\text{H}^+$  to balance the equation. The  $[\text{H}^+]$  in a basic solution is very small. The  $[\text{OH}^-]$  is much greater.

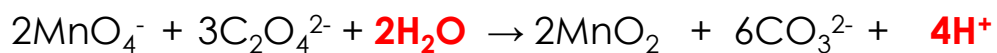
**For this reason, we will add enough  $\text{OH}^-$  ions to both sides of the equation to neutralize the  $\text{H}^+$  in the overall reaction.**

The hydrogen and hydroxide ions will combine to make water, and you may have to do some canceling before you're done.

6

## BALANCING A BASIC REACTION

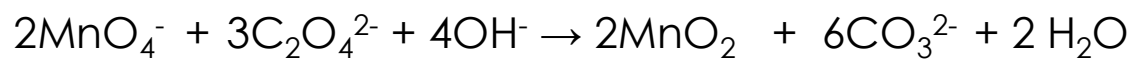
Balance the reaction as if acidic, then tweak it like this...



7

## ALWAYS CHECK YOUR ANSWER!

Count charges on both sides. If they are equal, you are golden!



8