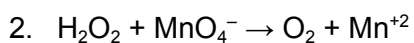
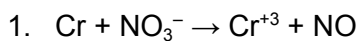


Balancing Redox Reactions in Acidic and Basic Solutions

This worksheet will cover balancing reduction-oxidation (redox) reactions in acidic and basic solutions, as we must account for the excess of H^+ ions (acidic) or OH^- ions (basic). It will discuss the steps of doing so and how the process differs in both situations. As you progress through the worksheet, you will develop the skills necessary to balance different redox reactions in acidic and basic solutions.

Redox Reactions in Acidic Solutions Practice

Balance the following reactions.

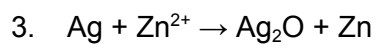
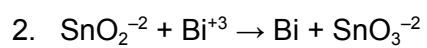
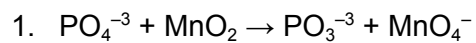


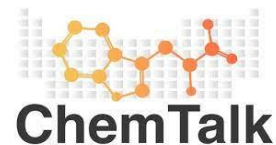


Unit 16: Electrochemistry

Redox Reactions in Basic Solutions Practice

Balance the following reactions.





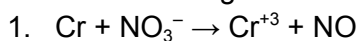
Unit 16: Electrochemistry

ANSWER KEY

Balancing Redox Reactions in Acidic and Basic Solutions

Redox Reactions in Acidic Solutions Practice

Balance the following reactions.

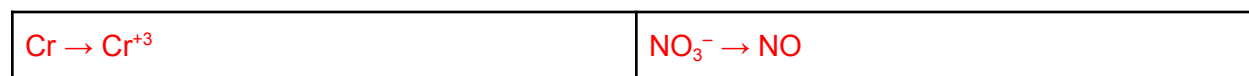


We can follow this model:

Balancing Redox Reactions in Acidic Solutions

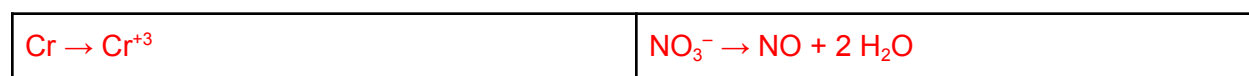
1. Split the redox reactions into $\frac{1}{2}$ reactions.
2. Balance all elements except H and O.
3. Balance O's with H_2O .
4. Balance H's with H^+ .
5. Balance charge with e^- 's.
6. Do 2-5 for both $\frac{1}{2}$ reactions.
7. Make sure the net number of e^- 's is the same for both reactions. Adjust if needed by multiplying both sides of a $\frac{1}{2}$ reaction by a least common multiple.
8. Sum $\frac{1}{2}$ reactions back into one reaction.

Step 1:

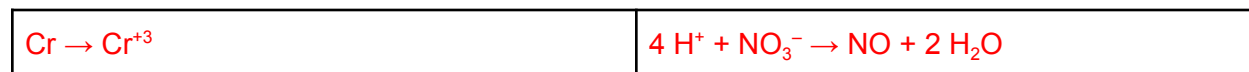


Step 2: The elements other than H and O are already balanced.

Step 3:



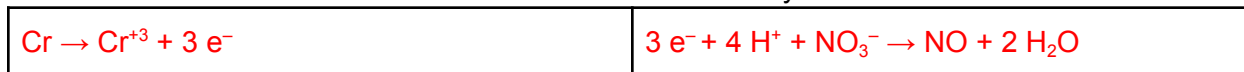
Step 4:



Step 5:

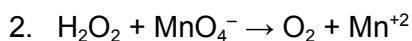
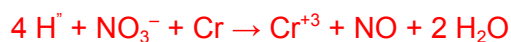


Unit 16: Electrochemistry

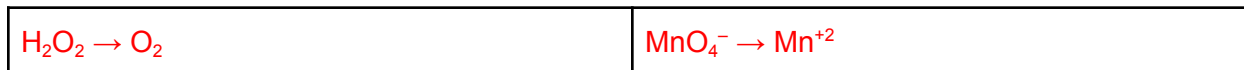


Step 7: The number of electrons on each $\frac{1}{2}$ reaction are the same.

Step 8:

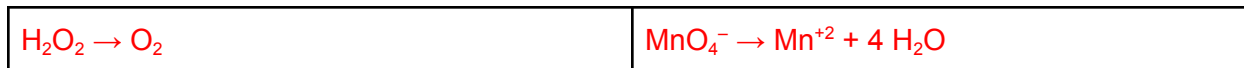


Step 1:

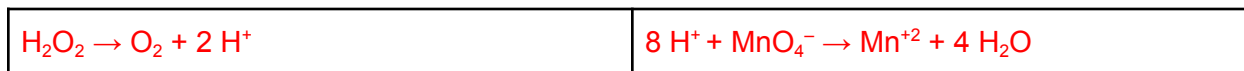


Step 2: The elements other than H and O are already balanced.

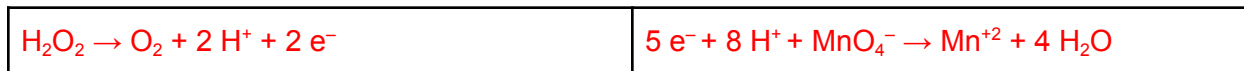
Step 3:



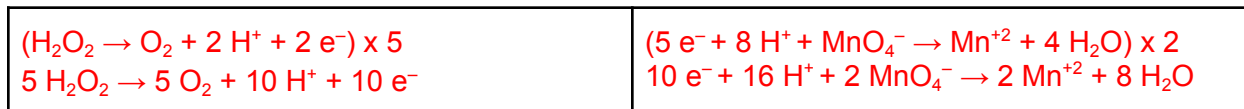
Step 4:



Step 5:



Step 7:

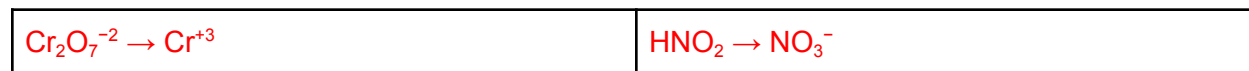


Step 8: Cancel out the H⁺'s and e⁻'s on each side.

Unit 16: Electrochemistry



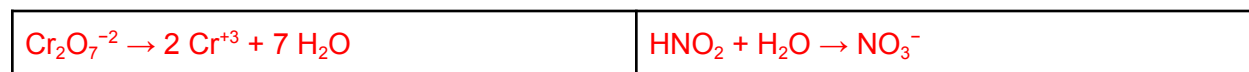
Step 1:



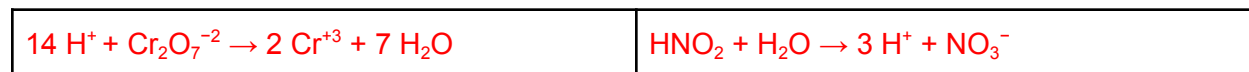
Step 2:



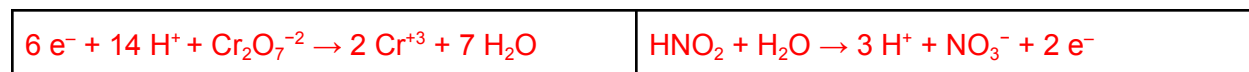
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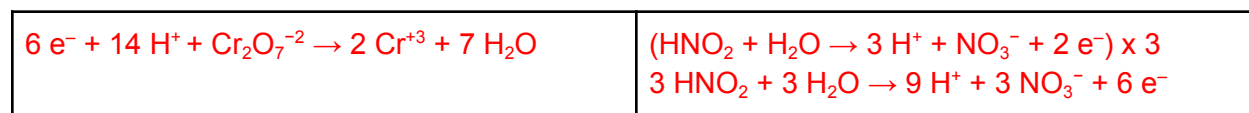
Step 4:



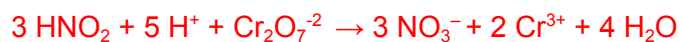
Step 5:



Step 7:



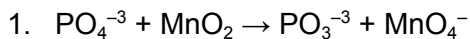
Step 8: Cancel out the H⁺'s and e⁻'s on each side.



Redox Reactions in Basic Solutions Practice

Unit 16: Electrochemistry

Balance the following reactions. Make sure to follow the steps above and keep track of the number of atoms and electrons.

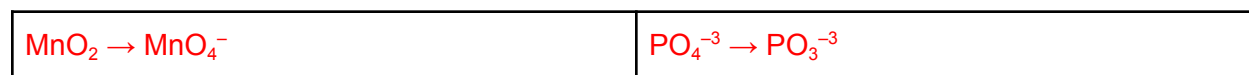


We can follow this model:

Balancing Redox Reactions in Basic Solutions

1. Follow steps 1-8 of "Balancing Redox Reactions in Acidic Solutions".
2. Add OH^- to neutralize all H^+ 's on both sides of the reaction.
3. On one side, combine H^+ 's and OH^- 's to make H_2O .
4. Eliminate as many H_2O s as possible.

Step 1:

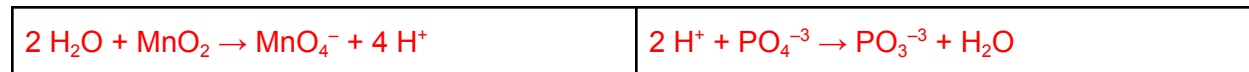


Step 2: The elements other than H and O are already balanced.

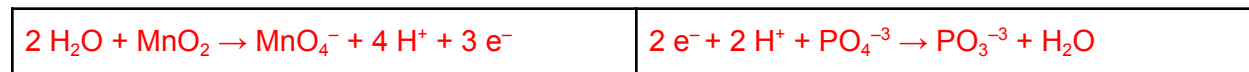
Step 3:



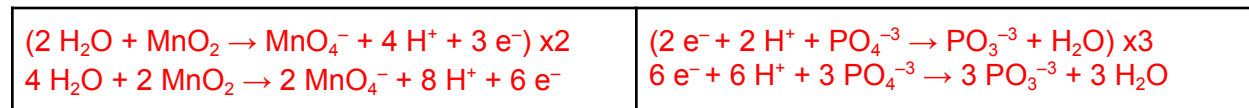
Step 4:



Step 5:

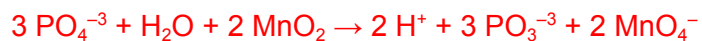


Step 7:



Unit 16: Electrochemistry

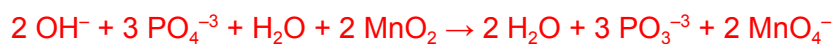
Step 8:



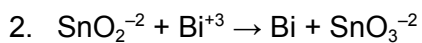
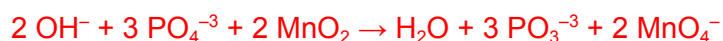
Step 2 (basic reaction steps):



Step 3:



Step 4:

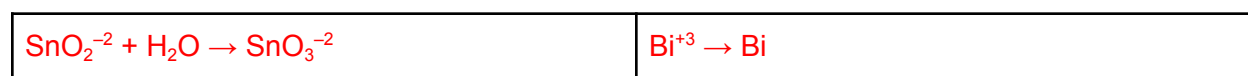


Step 1:



Step 2: All elements other than H and O are already balanced.

Step 3:



Step 4:

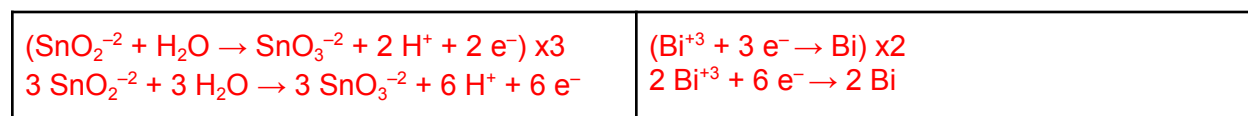


Step 5:

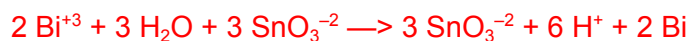


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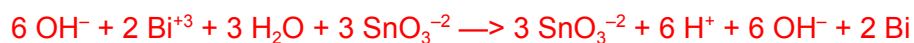
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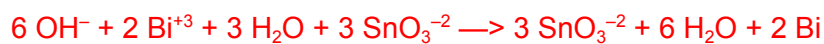
Step 8:



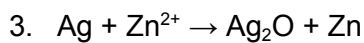
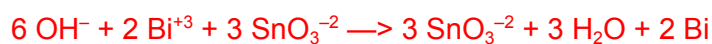
Step 2 (basic reaction steps):



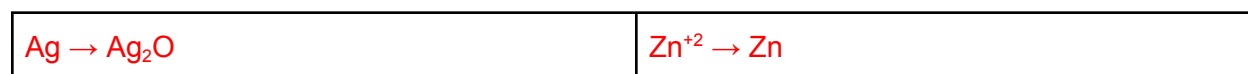
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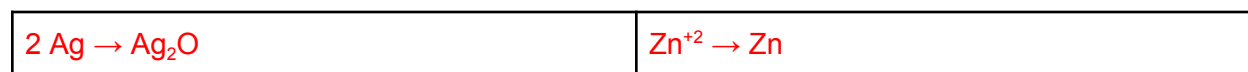
Step 4:



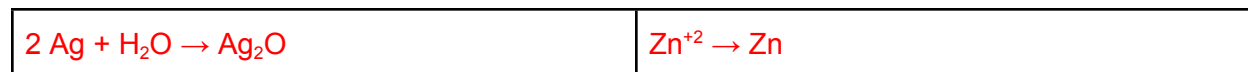
Step 1:

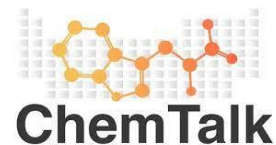


Step 2:



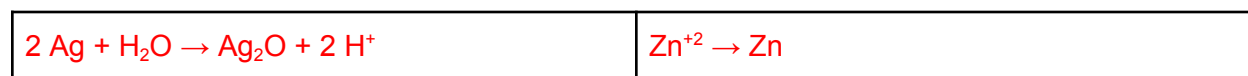
Step 3:



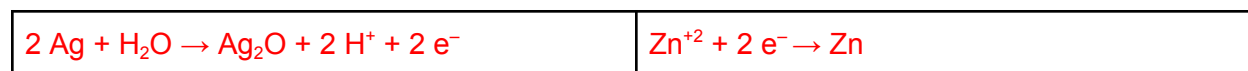


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Step 4:

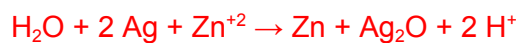


Step 5:

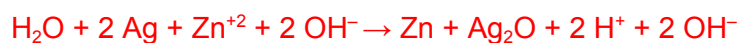


Step 7: The number of electrons are the same in each reaction.

Step 8:



Step 2 (basic reaction steps)::



Step 3:



Step 4:

