

What Are Oxidation and Reduction Rules?

Worksheet

Oxidation states follow a hierarchy of rules: free elements are 0; alkali metals are +1; oxygen is usually 2; hydrogen is usually +1; the sum equals the charge. Use these to predict redox behaviour.

Rules: (1) element = 0; (2) alkali/alkaline = +1/+2; (3) O = 2 (except pero

Questions

1. What is S's oxidation state in HSO?

- A) +2
- B) +4
- C) +6
- D) +8

2. In KMnO, Mn's oxidation state is

- A) +2
- B) +4
- C) +5
- D) +7

3. Oxidation state of O in KO?

- A) +1
- B) 1
- C) 2
- D) +2

4. In NH, N's oxidation state is

- A) 3
- B) 2
- C) +1
- D) +3

5. Assign oxidation states to Cr in KCrO.

6. What is N's oxidation state in NH?

7. In HO, what is O's oxidation state?

8. Define: Oxidation state rule for free elements?

9. Define: Oxidation state of O in most compounds?

10. Define: Oxidation state of H in most compounds?

Answer Key

1. C) +6 - H: +1 (2 atoms = +2); O: 2 (4 atoms = 8); S: x; sum 0: $2 + x + 8 = 0$ $x = +6$.
2. D) +7 - K: +1; O: 2 (4 = 8); Mn: x; sum 0: $1 + x + 8 = 0$ $x = +7$.
3. B) 1 - Peroxide exception: O is 1 (not 2).
4. A) 3 - H: +1 (3 = +3); N: x; sum 0: $x + 3 = 0$ $x = 3$.
5. K: +1 (alkali metal, 2 atoms +1 = +2) O: 2 (6 atoms 2 = 12) Cr: unknown (2 atoms x) Sum: $+2 + 2x + (12) = 0$
 $2x = +10$ $x = +6$ Cr in KCrO is +6.
6. H: +1 (4 atoms +1 = +4) N: unknown Sum = +1 (charge) $x + 4 = +1$ $x = 3$ N in NH is 3.
7. This is a peroxide-exception to 2 rule. H: +1 (2 atoms +1 = +2) O: unknown (2 atoms x) Sum = 0 $2 + 2x = 0$ $x = 1$ O in HO is 1 (peroxide).
8. Always 0 (e.g., Cu, O, N).
9. 2 (except peroxides, where it's 1).
10. +1 (except in metal hydrides like NaH, where it's 1).

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Promy turns exam dates into automatic reminders.