

20

OXIDATION-REDUCTION REACTIONS

Practice Problems

In your notebook, solve the following problems.

SECTION 20.1 THE MEANING OF OXIDATION AND REDUCTION

Determine what is oxidized and what is reduced in each reaction. Identify the oxidizing agent and the reducing agent.

1. $2\text{Sr} + \text{O}_2 \rightarrow 2\text{SrO}$
2. $2\text{Li} + \text{S} \rightarrow 2\text{Li}_2\text{S}$
3. $2\text{Cs} + \text{Br}_2 \rightarrow 2\text{CsBr}$
4. $3\text{Mg} + \text{N}_2 \rightarrow \text{Mg}_3\text{N}_2$
5. $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$
6. $\text{Cl}_2 + 2\text{NaBr} \rightarrow 2\text{NaCl} + \text{Br}_2$
7. $\text{Si} + 2\text{F}_2 \rightarrow \text{SiF}_4$
8. $2\text{Ca} + \text{O}_2 \rightarrow 2\text{CaO}$
9. $\text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2$
10. $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$

SECTION 20.2 OXIDATION NUMBERS

1. Give the oxidation number of each kind of atom or ion.

a. Sn	c. S^{2-}	e. Se	g. Sn^{4+}
b. K^+	d. Fe^{3+}	f. Mg^{2+}	h. Br^-
2. Calculate the oxidation number of chromium in each of the following formulas.

a. Cr_2O_3	b. $\text{H}_2\text{Cr}_2\text{O}_7$	c. CrSO_4	d. CrO_4^{2-}
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3. Use the changes in oxidation number to determine which elements are oxidized and which are reduced in these reactions. (Note: It is not necessary to use balanced reactions.)
 - a. $\text{C} + \text{H}_2\text{SO}_4 \rightarrow \text{CO}_2 + \text{SO}_2 + \text{H}_2\text{O}$
 - b. $\text{HNO}_3 + \text{HI} \rightarrow \text{NO} + \text{I}_2 + \text{H}_2\text{O}$
 - c. $\text{KMnO}_4 + \text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + \text{H}_2\text{O} + \text{KCl}$
 - d. $\text{Sb} + \text{HNO}_3 \rightarrow \text{Sb}_2\text{O}_5 + \text{NO} + \text{H}_2\text{O}$
4. For each reaction in problem 3 above, identify the oxidizing agent and reducing agent.