2. Determine whether each of the following substances will undergo dissociation, ionization or dissolving. Then write solvation equations for each of the substances when mixed with water. Show **physical states** of the products and balance the equations.

1. sodium chloride - Ionic; therefore will undergo dissociation in water

$NaCl_{(s)} \xrightarrow{H_2O} Na^+_{(aq)} + Cl^-_{(aq)}$

2. carbon tetrachloride – molecular; dissolving

$CCl_{4(l)} \xrightarrow{H_2O} CCl_{4(aq)}$

* diatomic elements don't have diatomic ions.

3. sodium hydroxide – ionic; dissociation

$NaOH_{(s)} \xrightarrow{H_2O} Na^+_{(aq)} + OH^-_{(aq)}$

4. ammonium acetate ionic; dissociation

$NH_4CH_3COO \xrightarrow{H_2O} NH_4^+_{(aq)} + CH_3COO^-_{(aq)}$

5. potassium hydroxide ionic; dissociation

$KOH_{(s)} \xrightarrow{H_2O} K^+_{(aq)} + OH^-_{(aq)}$

6. sulfuric acid molecular (acid); ionization

$H_2SO_{4(l)} \xrightarrow{H_2O} 2H^+_{(aq)} + SO_4^{2-}_{(aq)}$

7. potassium dichromate ionic; dissociation

$K_2Cr_2O_7 \xrightarrow{H_2O} 2K^+_{(aq)} + Cr_2O_7^{2-}_{(aq)}$

8. nitric acid molecular (acid); ionization

$$HNO_{3(\ell)} \xrightarrow{H_2O} H^+_{(aq)} + NO_{3(aq)}$$

9. copper (II) sulfate pentahydrate ionic; dissociation

$$CuSO_4 \cdot 5H_2O \xrightarrow{H_2O} Cu^{2+}_{(aq)} + SO_4^{2-}_{(aq)} + 5H_2O_{(\ell)}$$

10. potassium permanganate ionic; dissociation

$$KMnO_{4(s)} \xrightarrow{H_2O} K^+_{(aq)} + MnO_4^-{}_{(aq)}$$

11. sodium bicarbonate ionic; dissociation

$$NaHCO_{3(s)} \longrightarrow Na^+_{(aq)} + HCO_3^-{}_{(aq)}$$

12. sulfur dioxide molecular; dissolving

$$SO_{2(g)} \xrightarrow{H_2O} SO_{2(aq)}$$

13. hydrochloric acid molecular (acid); ionization

$$HCl_{(g)} \xrightarrow{H_2O} H^+_{(aq)} + Cl^-_{(aq)}$$