

Soluble	Except	Insoluble	Except
Na ⁺ , K ⁺ , Li ⁺ , NH ₄ ⁺	None	CO ₃ ²⁻	Group 1A, NH ₄ ⁺
NO ₃ ⁻	None	PO ₄ ³⁻	Group 1A, NH ₄ ⁺
Cl ⁻ , Br ⁻ , I ⁻	Ag ⁺ , Pb ²⁺ , Hg ₂ ²⁺	S ²⁻	Group 1A, NH ₄ ⁺
SO ₄ ²⁻	Ca ²⁺ , Ag ⁺ , Pb ²⁺ , Ba ²⁺	OH ⁻	Group 1A, Ca ²⁺ , Ba ²⁺

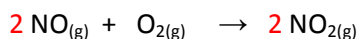
1. Write the balanced molecular equation, complete ionic equation, and net ionic equation for the following double displacement reaction. Include phase labels for full credit. (5 pts)



2. The density of water is 1.00 g/mL at 4 °C. How many water molecules are present in 2.56 mL of water at this temperature? (Hint: 6.02×10^{23} molecules per mole) (2 pts)

$$\text{density} = 1.00 \frac{\text{g}}{\text{mL}} \times 2.56 \text{ mL} \times \frac{1 \text{ mol}}{18 \text{ g}} \times 6.02 \times 10^{23} = 8.56 \times 10^{22} \text{ molecules}$$

3. Nitric Oxide, NO, reacts with oxygen gas to form nitrogen dioxide, NO₂:



If 0.503 moles of NO is mixed with 0.503 moles of O₂, calculate the theoretical yield (in grams) for the production of nitrogen dioxide. Clearly state which reagent is the limiting reagent. (3 pts)

$$0.503 \text{ moles O}_2 \times \frac{2 \text{ mol NO}_2}{1 \text{ mol O}_2} = 1.006 \text{ mol NO}_2$$

$$0.503 \text{ moles NO} \times \frac{2 \text{ mol NO}_2}{2 \text{ mol NO}} = 0.503 \text{ mol NO}_2$$

NO is the limiting reagent.

$$0.503 \text{ mol NO}_2 \times 46 \text{ g/mol} = 23.1 \text{ g NO}_2$$