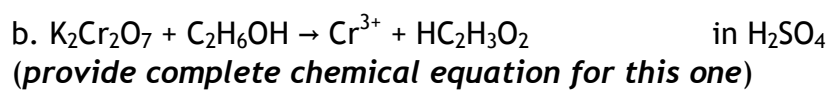
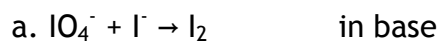


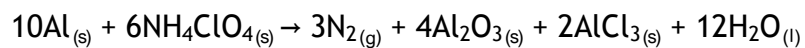
1. A gaseous substance is found to have the following percent composition: 37.48% C, 12.58% H, and the rest is O. When 1.074 g of this substance is heated to a temperature of 71.6°C at 743.8 mmHg it occupies a volume of 969.0 mL. What is the *molecular formula* of the compound?

2. Balance the following oxidation-reduction reactions.



3 Acetone vapor ($\text{C}_3\text{H}_6\text{O}$) burns to produce carbon dioxide gas and water vapor. What **volume, in L, of carbon dioxide** gas at STP can be produced when 145.6 L of acetone vapor at 76.5°C and 1.036 atm reacts with 613.2 L of oxygen gas at 86.9°C and 732.5 mmHg?

4. Calculate the **amount of energy, in J**, released when 25.0 metric tons (1 metric ton = 1000 kg) of Aluminum metal reacts with excess ammonium perchlorate according to the reaction

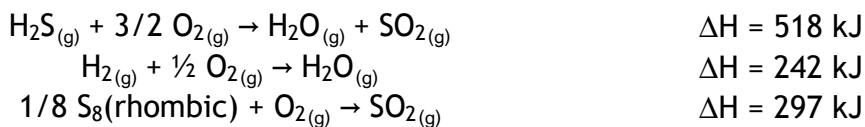


Substance	ΔH_f° (kJ mol ⁻¹)
$\text{NH}_4\text{ClO}_{4(s)}$	-295.3
$\text{Al}_2\text{O}_{3(s)}$	-1675.7
$\text{AlCl}_{3(s)}$	-704.2
$\text{H}_2\text{O}_{(g)}$	-241.818

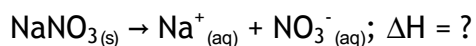
5. Hydrogen sulfide, H_2S , is a poisonous gas with the odor of rotten eggs. The reaction for the formation of H_2S from the elements is



Use Hess' law to obtain **the enthalpy change** for this reaction from the following enthalpy changes:



6. When 15.3 g of sodium nitrate, NaNO_3 , was dissolved in water in a calorimeter, the temperature fell from 25.00°C to 21.56°C . If the heat capacity of the solution and the calorimeter is $1071 \text{ J}/^\circ\text{C}$, what is the **enthalpy change** when 1 mol of sodium nitrate dissolves in water? The solution process is



7. A particular gas is found to have a root-mean-square speed, u_{rms} , of 337.1 m s^{-1} at standard thermodynamic temperature.

a. What is the *molar mass of the gas in g mol^{-1}* ?

b. If 1.00 mol of this gas effuses in 15.67 min , how many *minutes* will it require for 1.00 mol of Nitrogen dioxide to effuse in the same apparatus?