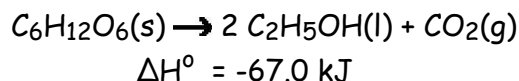


# Stoichiometry and Heat Capacity

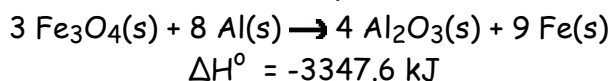
1. Calculate the heat evolved (kJ) for the reaction in which 9.00 g of  $C_6H_{12}O_6$  is fermented to form ethyl alcohol

(Atomic weights: C = 12.01, H = 1.008, O = 16).

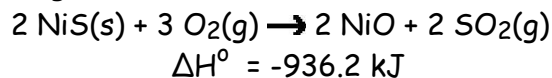


2. Calculate the heat energy (kJ) released when 15 g of  $Fe_3O_4$  reacts with excess Al according to the following reaction.

(Atomic weights: Fe = 55.85, Al = 26.98, O = 16.00).



3. What quantity of heat is liberated by a reaction that produces 50.0 g of  $SO_2$  in the following reaction? (Atomic weights: Ni = 58.69, O = 16.00, S = 32.06).



4. A 25.0 g piece of copper at  $25.0^\circ C$  is put into an insulated vessel containing 100 g of water at  $40.0^\circ C$ . What will be the final temperature ( $^\circ C$ ) of the water? The specific heat of copper and water are  $0.385 \text{ J/g}^\circ C$  and  $4.18 \text{ J/g}^\circ C$  respectively.

5. How much heat energy (kJ) must be supplied to heat 400.0 g of isopropyl alcohol from  $20.0^\circ C$  to  $60.0^\circ C$  in a stainless steel vessel weighing 550.0 g. The specific heat of isopropyl alcohol and stainless steel are  $2.58 \text{ J/g}^\circ C$  and  $0.51 \text{ J/g}^\circ C$  respectively.

6. A sheet of 10.0 g of copper at  $22.0^\circ C$  is placed on a 20.0 g sheet of aluminum at  $75.0^\circ C$ . What is the final temperature of the two metals assuming that no heat is lost to the surroundings. The specific heats of copper and aluminum are  $0.385 \text{ J/g}^\circ C$  and  $0.900 \text{ J/g}^\circ C$  respectively.