

Part I. Multiple choice

page 2:

1. D
2. D
3. B
4. C
5. C

page 3:

6. A
7. D
8. D
9. C
10. D
11. B

page 4:

12. A
13. A
14. C
15. A
16. C

page 5:

17. C
18. B
19. E

Part II. Problems

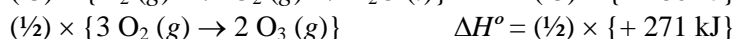
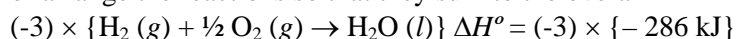
1. worth 10 pts

Either use Hess's law in the form of

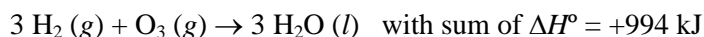
$$\Delta H_{rxn}^{\circ} = \sum_{\text{products}} (\text{stoich coeff}) \Delta H_f^{\circ} - \sum_{\text{reactants}} (\text{stoich coeff}) \Delta H_f^{\circ}$$

$$\begin{aligned} \Delta H_{rxn}^{\circ} &= [\Delta H_f^{\circ}(\text{O}_3(\text{g})) + 3\Delta H_f^{\circ}(\text{H}_2(\text{g}))] - [3\Delta H_f^{\circ}(\text{H}_2\text{O}(\text{l}))] \\ &= \left[\left(\frac{+271 \text{ kJ}}{2} \right) + 3(0) \right] - [3(-286 \text{ kJ})] \\ &= +994 \text{ kJ} \end{aligned}$$

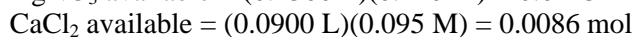
or arrange the reactions so that they sum to the overall rxn



sums to:



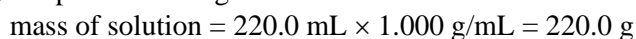
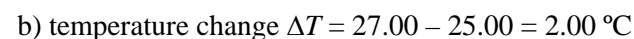
2. worth 20 pts, each part worth 5 pts



need 2:1 mole ratio, so AgNO_3 is limiting

moles of AgCl that form:

$$= 0.0143 \text{ mol AgNO}_3 \times \frac{2 \text{ mol AgCl}}{2 \text{ mol AgNO}_3} = 0.0143 \text{ mol AgCl}$$



heat,

$$q = mC\Delta T = (220.0 \text{ g}) \left(4.184 \frac{\text{J}}{\text{g}\cdot^{\circ}\text{C}} \right) (2.00^{\circ}\text{C}) = 1841 \text{ J} = 1.84 \text{ kJ}$$

c) reaction shown is exothermic because water temperature increased (indicating that reaction system gave off heat energy)

$$\text{d) } \Delta H_{rxn} \text{ in } \frac{\text{kJ}}{\text{mol AgCl}} = \frac{1.84 \text{ kJ}}{0.0143 \text{ mol AgCl}} = 129 \text{ kJ/mol}$$

$$\text{so } \Delta H_{rxn} = -129 \text{ kJ/mol}$$