

Hard Packet 1

Team ID:

Thermodynamics

4400-4700 mL

Electrochemistry

8.5-9.1 hours

Chemical Reactions

0.02-0.03 moles of CO₂ gas produced

Physical Properties

Pressure is **34-37** torr

Physical Properties

- a) T-shaped**
- b) Square Planar**

Thermodynamics

LI > LIII > LII > MIII > MI > LIV

Acid/Base

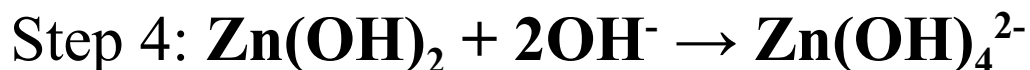
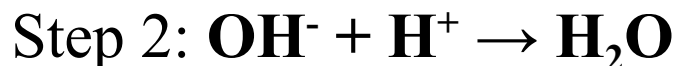
- A. equal
- B. equally strong
- C. weaker
- D. turns into a weak
- E. 15 and 7

Equilibrium

- a) **CuCl** will precipitate first and **$1.9-2.1 \times 10^{-5}$ M** of Cl is required.
- b) **$5.3-5.7 \times 10^{-5}$ M**
- c) **2.3-2.6 g**

Equilibrium

Yes, and if so, $5.0-5.6 \times 10^{-6}$ % of Al^{3+} and 100% of Ba^{2+} would remain in the solution

Chemical Reactions

pH after step 1 = 0.64-0.7

Thermodynamics

$$\Delta H^\circ = \mathbf{-290 \text{ to } -320 \text{ kJ/mol}}$$

$$\Delta G_f^\circ = \mathbf{-27 \text{ to } -33 \text{ kJ/mol}}$$

Physical Properties

$$\mathbf{R = 0.13-0.14 \text{ L}\cdot\text{atm}\cdot\text{mol}^{-1}\cdot\text{K}^{-1}}$$

Hard Packet 5

Team ID:

Thermodynamics

$2.3-2.8 \times 10^{-19}$ g of ethane required

Acid/Base Chemistry

$2.4 - 2.8 \times 10^{-7}$ moles

Thermodynamics

9-10 minutes

Hard Packet 6

Team ID:

Chemical Reactions

930-990 torr

Thermodynamics

226.55 kJ/mol

Kinetics

$$\text{Rate} = \frac{k_2 k_1 [A][B][C]}{k_{-1} + k_2 [C]}$$

Physical Properties

- 1) Functional groups: **OH** or **hydroxy**
- 2) Species at $m/z=31$: **$^+\text{CH}_2\text{OH}$** (must have **positive charge somewhere**)

Physical Properties

9 isomers

Kinetics

- a) Reaction (A/B) has a greater spontaneity by **9-9.5 kJ.**
- b) $K_{\text{eq}} = \mathbf{8.2-8.5}$
- c) Above **320-335 C**
- d) $\Delta H^\circ_{298} = \mathbf{-23 \text{ to } -29 \text{ kJ/mol}}$