

Revised August 2011

AP LAB 13c: Le Chatelier's Principle Simulation II

Use the simulation at the following URL to answer the questions that follow;

<http://bit.ly/4BxfOS>

Listen to the audio that plays once the page has loaded. The audio lasts only approx. 30 seconds.

1. Click on the Change in Concentration button **and listen to the audio.**

Change in Concentration

- (a) Why does the solution start out as an orange color?
- (b) What is the generic name for a species such as $[\text{FeSCN}]^{2+}$?
- (c) The name of $[\text{FeSCN}]^{2+}$ includes what Roman numeral?

2. Click on the Add NaSCN button **and listen to the audio.**

Add NaSCN

- (a) What property of NaSCN makes it a good source of $\text{SCN}^-_{(\text{aq})}$ when added to the beaker?
- (b) Which of the following will cause a similar shift to adding NaSCN?
 - (i) adding KSCN
 - (ii) adding $\text{Fe}(\text{NO}_3)_3$
 - (iii) adding $[\text{FeSCN}]^{2+}_{(\text{aq})}$

3. Click on the Back button.

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4. Click on the Remove Fe^{3+} button **and listen to the audio.**

Remove Fe^{3+}

- (a) Write the formula for oxalic acid.
- (b) What is the IUPAC name for the oxalate ion?
- (c) Assuming that addition of oxalate ions to the equilibrium mixture produces the trioxalatoferrate(III) ion, write an equation to show its formation.

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5. Click on the Back button.

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6. Click on the Change in Pressure button **and listen to the audio.**

Change in Pressure

- (a) What happens to the entropy of the equilibrium system as the reaction goes from left to right?
- (b) What is the name of the gas law that relates pressure and volume? Write a mathematical expression to summarize it.

7. Click on the Increase Pressure button **and listen to the audio.**

Increase Pressure

- (a) Why does the reaction mixture become darker?
- (b) Does the reverse reaction represent the standard enthalpy of formation of $I_{2(s)}$? Explain your answer.

8. Click on the Back button.

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9. Click on the Decrease Pressure button **and listen to the audio.**

Decrease Pressure

- (a) Write a mathematical expression that relates the pressure, volume and number of moles of a gas to one another that allows the effect of a change in any of those variables to predict the new conditions.
- (b) Which specific enthalpy change(s) does the transition $I_{2(g)} \rightarrow 2I_{(g)}$ represent? What is the sign(s) of those change(s)?

10. Click on the Back button.

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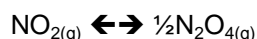
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11. Click on the Change in Temperature button **and listen to the audio.**

Change in
Temperature

- (a) Write the K_c expression for the equilibrium shown.
- (b) Write the K_p expression for the equilibrium shown.
- (c) If the K_c for the reaction shown has a value of X , what is the value for the K_c of the reaction shown below?



12. Click on the Increase Temperature button **and listen to the audio.**

Increase Temperature

- (a) What will be the effect of adding heat to an equilibrium system that is exothermic in the forward direction.
- (b) What happens to the temperature of the surrounding when a system (reaction) that is endothermic, reacts?

13. Click on the Back button.

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14. Click on the Decrease Temperature button **and listen to the audio.**

Decrease Temperature

- (a) Draw a Lewis structure for NO_2 .
- (b) Use the Lewis structure you have drawn in (a) to explain the formation of the N_2O_4 molecule.