

Spring 2020

CHEMISTRY 320 - STRATOSPHERE

1. REGIONS OF THE ATMOSPHERE

Discuss the composition, chemistry and dynamics of the atmosphere to 50 km above the Earth's surface.

A. Draw diagram of the atmosphere to 50 km. Include:

- i. Temperature profile
- ii. Pressure profile
- iii. Ozone concentration profile

2. CONCENTRATION UNITS FOR ATMOSPHERIC GASES

- A. Absolute concentration to relative concentration.
 - i. Show calculations on how to convert between molecules per cubic centimeter and mole fractions (ppm, ppb, ppt)

3. ABSORPTION OF LIGHT BY MOLECULES

- A. Discuss the mechanism on how molecules absorb light in the UV/Vis region of the electromagnetic spectrum?

4. FILTERING OF SUNLIGHT'S UV COMPONENT.

- A. Why is this important to life on earth as we know it?

5. EFFECT OF UV ON DNA

A. What are the effects?

B. How do they differ around the globe?

6. VARIATION OF LIGHT'S ENERGY WITH WAVELENGTH

A. Planks Equation

B. What is necessary for a molecule to undergo photo dissociation?

7. CREATION OF STRATOSPHERIC OZONE

A. Write out the mechanism (The reaction).

- i. Describe why ozone concentration levels are highest in the mid stratosphere.
- ii. How does the mechanism relate to the temperature profile in the stratosphere?
- iii. How does this relate to the mixing dynamics in the stratosphere”?

8. DESTRUCTION OF STRATOSPHERIC OZONE

A. Non-catalytic

- i. Write the Chapman mechanism

B. Catalytic

- i. Mechanism I

- ii. Mechanism II

C. X catalysts

i. What are X catalysts?

1. *List a few.*

D. In terms of the Arrhenius Equation, why are the catalytic pathways important?

9. PROBLEMS

1. *See webpage link*