ENSCI/AE.CE 524B Assignment 2: Atmospheric Photochemical Reactions

Due March 3, 2011

- 8.12 Indicate whether the following halocarbons are CFCs, HCFCs, HFCs, or halons, and give their designation numbers:
 - (a) C₃HF₇
 - (b) C₂FH₃Cl₂
 - (c) $C_2F_4Cl_2$
 - (d) CF₃Br
- 8.13 Write chemical formulas for the following:
 - (a) HCFC 225
 - (b) HFC 32
 - (c) H 1301
 - (d) CFC 114
- 8.36 The photon energy required to cause the following reaction to occur is $306 \frac{kj}{mol}$. What is the maximum wavelength that the photon can have (you might want to refer back to Example 2.6)?

$$NO_2 + hv \rightarrow NO + O$$

8.37 Photodissociation of oxygen requires $495 \frac{kJ}{mol}$. What maximum wavelength can the photon have to drive this reaction (refer to Example 2.6)?

$$0_2 + h v \rightarrow 0 + 0$$

- 9.6 Assuming that Figure 9-4 represents the relationship between NO_x , VOC, and O_3 concentrations for an urban area, determine the percent reduction or increase in the ozone concentration for the following strategies. The concentration of VOCs is $1.2 \, ppmC$ and the concentration of NO_x is 0.08 ppm. Assume that a reduction in the VOC and NO_x emissions is equivalent to the reduction in the concentration of these pollutants. (a) Reduce NO_x emissions by 75 percent while holding VOCs constant, (b) Reduce VOC emissions by 75 percent while holding NO_x constant, (c) Reduce NO_x and VOCs by 75 percent.
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 - (b) Reduce VOC emissions by 75 percent while holding NO_x constant
 - (c) Reduce NO_x and VOCs by 75 percent

It is to be expected that values calculated will vary as reading these graphs is challenging for accurate readings. Your % removals could easily be 5% or more lower or higher.