## NAME/TEAM: \_\_

## Catalytic Converter (NOx) Prelab

Last modified: June 17, 2014

## **Recommended reading:**

AirUCI Lab Manual: Environmental Chemistry Text:

Catalytic Converter Lab Pages: 6, 7, 13–16 on Light Absorption Pages: 91–94 and 96–98 on Catalytic Converters Pages: 94–96 on Air Quality Standards

## **Prelab Questions:**

1) What are the goals of this experiment?

2) What gases are expected to be present in "raw" untreated car exhaust? What gases should be present in car exhaust that has passed through an efficient 3-way catalytic converter?

3) What is meant by the term "3-way catalyst?"

4) Vehicles are a major source of CO<sub>2</sub> to the atmosphere. Why do we have to be concerned with CO<sub>2</sub> emissions and what steps can be taken to reduce CO<sub>2</sub> emissions from automobiles? Do catalytic converters help here?

5) Write the Beer–Lambert Law that relates absorbance, pathlength, and concentration. Imagine that you plot absorbance as a function of concentration. A form of the equation that is useful for fitting this experimental plot is: "y = mx + b". Relate the variables and linear fit parameter (y, m, x, and b) to the constants used in Beer's Law.

6) Dilution of solutions is very common in "wet" labs. In this lab, a nitrite  $(NO_2^{-})$  solution of approximately 5 µg/mL will be used to make 4 standard solutions of varying concentrations. If 500.0 µL of the 5 µg/mL solution is diluted to 25.00 mL in a volumetric flask, what is the resulting concentration of the diluted standard solution in µg/mL. (Remember the dilution equation:  $C_1V_1 = C_2V_2$  where C = concentration; V = volume).