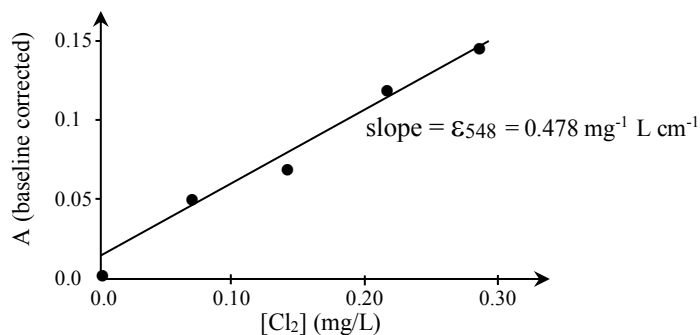


### Prelab Questions--Experiment 10: Efficiency of Chlorine Removal

(a). A calibration curve for the determination of  $\text{Cl}_2$  in drinking water is constructed as shown below. Calculate the concentration of  $\text{Cl}_2$  in mg/L if the absorbance of a sample is 0.066 for a cuvette path length of 1.000 cm.



(b). Calculate the effective  $\text{Cl}_2$  concentration in mg/L that corresponds to a standard  $\text{KMnO}_4$  solution prepared by adding  $75.0 \mu\text{L}$  of  $5.000 \times 10^{-4} \text{ M}$   $\text{KMnO}_4$  to a 100-mL volumetric flask. Assume the volumetric flask has four significant figures in the volume.

(c). Why can  $\text{KMnO}_4$  be used to prepare the standards for this experiment?

- The absorbance spectrum of  $\text{KMnO}_4$  is the same as the oxidized DPD reagent.
- The reaction of  $\text{KMnO}_4$  with DPD gives  $\text{Cl}_2$  as the product.
- The number of electrons transferred per mole of  $\text{KMnO}_4$  is the same as for  $\text{Cl}_2$ .
- The product of the oxidation of DPD by  $\text{MnO}_4^-$  is the same as for  $\text{Cl}_2$ .