**Exercise #3: Guided practice Finding [Cu2+ ] and [Ni2+ ] in an unknown solution**

**Via AAS Method (Experiment #3)**

*Chem 6614 Chemical Instrumentation*

The following standard addition series is prepared

**Standard addition volume, Vs = 5.00 mL.**

**Volumetric flask volume= 50.00 mL**

**Known standard addition Cstd = 10 ppm**

**TABLE OF SOLUTION VOLUMES AND OBSERVED ABSORBANCES FOR AQUEOUS Cu2+** **AT 327 nm**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **standard**  **solution #** | **Volume of**  **unknown added (mL)** | **X=# standard**  **additions of Cstd** | **volume of standard addition, mL** | **A(observed) of 50 mL**  **of standard solution** |
| **1** | **5.00** | **0** | **0.00** | **0.302** |
| **2** | **5.00** | **1** | **5.00** | **0.404** |
| **3** | **5.00** | **2** | **10.0** | **0.501** |
| **4** | **5.00** | **3** | **15.0** | **0.610** |
| **5** | **5.00** | **4** | **20.0** | **0.748** |

1. ***plot A(observed) vs the # standard additions of CSTD Excel.***
2. ***Use linear regression to fit A(Obs) vs X=std addition # to the equation:***

A(0bs) = MX + B

M= \_\_\_0.1098\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

B=\_\_\_\_0.2934\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. ***Find the value of `X’ = Xu when A=0 using your regression equation in 2.2b***

Xu = \_\_2.67\_\_\_\_\_\_\_\_ 0=0.1098\*Nu +0.2934=> 0.2934/0.1098 =2.67=Xu

***d) Noting that Xu is equivalent to the # of 10 ppm standard additions initially present because of the addition of the 5 mL unknown sample ;***

***Compute the mg of Cu2+ present in the 5 mL aliquot of unknown***

***10 ppm = 10 μg Cu/mL=>***

***amount of Cu in 5 mL of unknown std add=2.67\*5 mL \* 10 μg Cu/mL = 133.5 μg Cu=0.1335 mg***

mg Cu in 5 mL sample of unknown=\_\_\_\_\_\_\_0.1335\_\_\_\_\_\_\_\_\_\_\_\_\_

***Compute the concentration of Cu2+ in ppm in the 5 mL unknown aliquot*** Concentration of Cu in unknown aliquot = \_\_\_\_\_26.7\_\_\_\_\_\_\_\_\_\_ ppm Cu2+

Ppm =mg/L = 0.1335/0.005=26.7

e ) The standard unknown addition solution was made from an original unknown by diluting 2

mL of the original in 100 mL. What is the concentration of Cu2+ in the original unknown in:

Dilution factor = 2/100 = 0.02=> un-dilution factor = 1/0.02=50

\_\_\_1335\_\_\_\_\_\_\_ ppm \_\_\_0.0210\_\_\_\_\_\_ M

26.7\*50=1335 mg Cu2+ /L =1.35 g Cu2+ /L => 1.5/63.541 mol Cu2+/L=0.0210 M