**Exercise #2: Guided practice Finding [Cu2+ ] and [Ni2+ ] in an unknown solution**

**Via UV-VIS method (Experiment #2)**

*Chem 6614 Chemical Instrumentation*

*Answers*

**2.1. Calibration curves**

The following absorbances (A) are observed at 803 nm and 393 nm for the Cu(II) and NI(II) standards between 0 and 0.0500 M

**Table 1a: A(obs) vs [Cu(II),M] standards at λ1 =800 nm and λ2= 400 nm**

|  |  |  |
| --- | --- | --- |
| [Cu2+(M)] std | A(0bs), λ1 =803 nm | A(Obs), λ2 =393 nm |
| 0.000 | 0.000 | 0 |
| 0.0100 | 0.071 | 0.003 |
| 0.0200 | 0.151 | 0.005 |
| 0.0300 | 0.207 | 0.007 |
| 0.0400 | 0.283 | 0.003 |
| 0.0500 | 0.345 | 0.002 |

**Table 1b: A(obs) vs [Ni(II),M] standards at λ1 =800 nm and λ2= 400 nm**

|  |  |  |
| --- | --- | --- |
| [Ni2+(M)] std | A(0bs), λ1 =803 nm | A(Obs), λ2 =393 nm |
| 0.000 | 0.000 | 0.000 |
| 0.0100 | 0.0096 | 0.053 |
| 0.0200 | 0.0198 | 0.100 |
| 0.0300 | 0.0291 | 0.147 |
| 0.0400 | 0.0388 | 0.210 |
| 0.0500 | 0.0490 | 0.246 |

1. ***Use Excel to plot and fit the standard data above to a linear regression model:***

A = m[Cu2+] +b

Slopes intercepts correlation coefficient

λ1 m1 = \_\_\_\_6.800\_\_\_\_\_\_\_ b1 = \_\_\_0.00743\_\_\_\_\_\_\_\_ r2 = \_\_\_\_\_0.998\_\_\_\_\_\_\_\_

λ2 m2 = \_\_\_\_-0.04\_\_\_\_\_\_\_ b2=\_\_\_\_0.0052\_\_\_\_\_\_\_\_\_ r2= \_\_\_\_\_0.100\_\_\_\_\_\_\_\_

A= m’[Ni2+] + b’

λ1 m1’= \_\_\_0.978\_\_\_\_\_\_\_ b1’ = \_\_\_-8E-5\_\_\_\_\_\_\_\_\_ r2 = \_\_\_\_\_0.999\_\_\_\_\_\_\_\_\_

λ2 m2 ‘ = \_\_\_4.96\_\_\_\_\_\_\_\_ b2’=\_\_\_\_0.0024\_\_\_\_\_\_\_\_ r2= \_\_\_\_\_0.995\_\_\_\_\_\_\_\_\_

**2.2 Absorbance of unknown solution at 803 and 393 nm**

**803 nm 0.235**

**393 nm 0.125**

**2.3. Use fits and unknown absorbances to find x=[Cu2+] and y= [Ni2+]**

From Excel program: [Cu2+]=0.0161 M [Ni2+]=0.0144 M