EXTERNAL STANDARDS

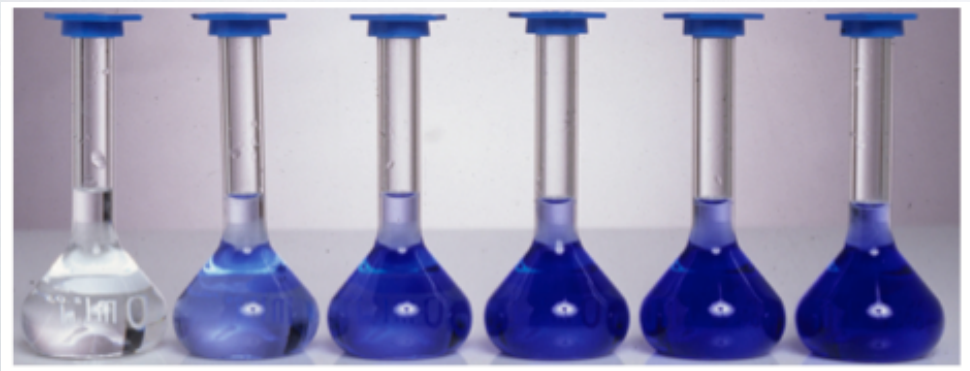
SDSU CHEM 251

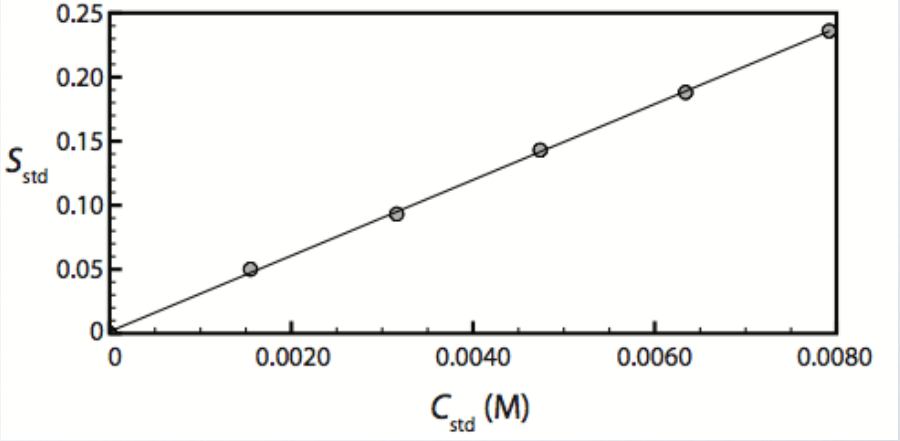
EXTERNAL STANDARDS

- **External standards** are the most common form of standardizations - external standards are prepared with **known** quantities of the pure **analyte**.

- Single external standard: can be effective, but should be tested experimentally to ensure that the k_A is independent of conc.

- Multiple external standards: standard solutions with a range of concentrations, are preferred to be used for calibrations, and are used to generate a normal calibration curve.





SAMPLE PROBLEM

A blood sample is to be measured to determine the amount of Pb^{2+} present in the sample.

The spectrophotometric measurement of a Pb^{2+} sample with a concentration of 1.75 ppb yields a signal of 0.474 AU.

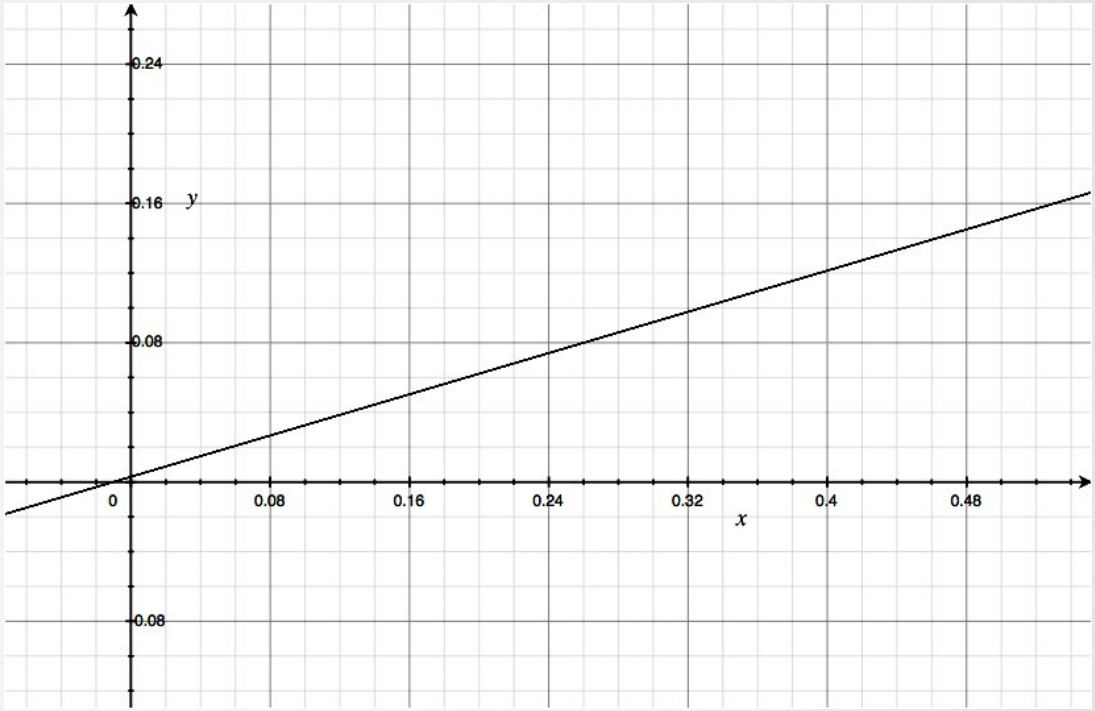
If the blood sample was measured with the same instrument and a signal of 0.361 AU was obtained, what is the concentration of Pb^{2+} in the blood sample?

SAMPLE PROBLEM

Instead of using a single point calibration a series of Pb^{2+} standards were prepared an a calibration graph produced from the results. The linear plot of the data yields a line equation of graph:

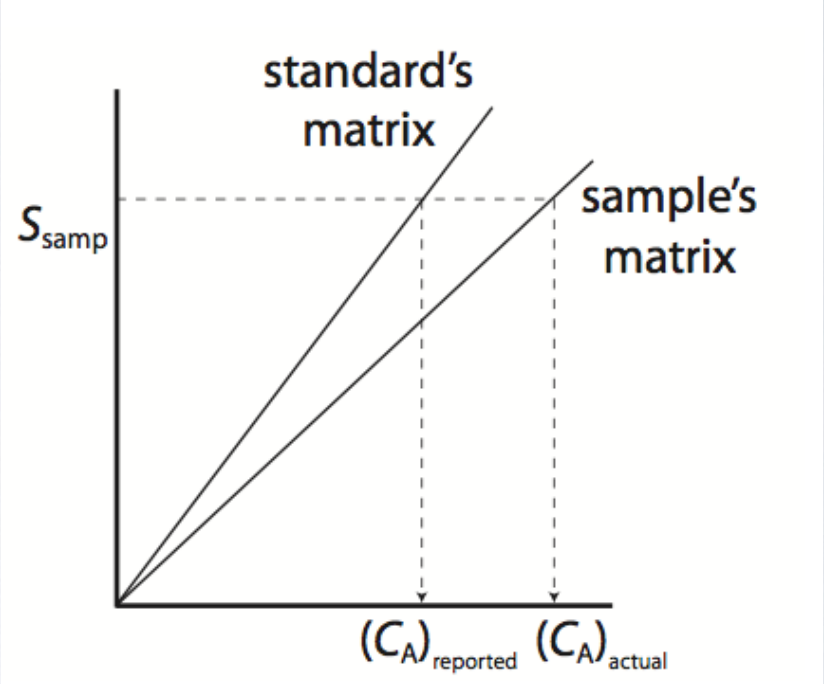
$$S_{std} = (0.299\,AU/ppb) \times C_{Pb^{2+}} + 0.003$$

If a blood sample was measured and found to have an absorbance signal of 0.361 AU, what is the concentration of lead in the blood?



EXTERNAL STANDARDS

- The benefit of external standards is that one calibration curve can be used to measure multiple sample solutions.
- The great **limitation** of this approach is that the standard and sample may not have the same matrix and this may alter the signal (sensitivity $\boldsymbol{k}_A$).
- Can be mitigated by using similar matrix for both sample and standard



An example of the matrix reducing the analyte's signal.