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.
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 and a calibration graph produced from the results. The linear plot of the data yields a line equation of graph:

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

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 $k_A$).

• Can be mitigated by using similar matrix for both sample and standard

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