

Analysis of Water Using ICP

(Inductively Coupled Plasma)

You will be analyzing water samples for the presence of the following ions: Ca, Mg, Na, K, Zn, Mn, Cu, Fe, Ag, As, Ba, Cd, Pb, and Se. You will be using an instrument called the Inductively Couple Plasma (ICP) spectrometer. The flame test investigation will help you understand the basic operation of the ICP. The stock solution you will be using to prepare your series of dilute solutions contains the following concentrations of each of the metal ions:

Metal Ion	Concentration, mg/L (or ppm)
Ag	1.0
As	1.0
Ba	1.0
Ca	250
Cd	0.5
Cu	10.0
Fe	10.0
K	250
Mg	250
Mn	10.0
Na	250
Pb	0.5
Se	0.5
Zn	250

As a class we will prepare a set of standard solutions from the stock solution. Each team will be responsible for preparing one of the standards after the class decides what standards to prepare. You will prepare the dilutions in 100 mL volumetric flasks with 1% nitric acid solution as the solvent.

The metal ions present in the stock solution used in the analysis of drinking water were divided among the college students. These different metal ions may be present in your drinking water. Responses to the following questions have been tabulated.

- Is the metal ion listed on the EPA primary or secondary list of drinking water contaminants? <http://water.epa.gov/drink/contaminants/index.cfm>
- If yes, what are the MCL and the MCLG values? Why is the metal included on the list – what are the adverse health effects of this metal ion in humans?
- If the metal ion is not on the list of contaminants, does it have a positive health impact? Explain.

(d) What are sources of this metal ion in drinking water?

(e) If the concentration of this metal ion is too high, how can the level be reduced?

Once the data are collected, separate calibration curves will be generated for the 14 ions present in the stock solution. These will be used to analyze your own water samples.