

## Atomic Emission- SODIUM

**Purpose:** to gain experience using the atomic emission (AE) spectrophotometer.

### Materials:

|                                       |                                     |
|---------------------------------------|-------------------------------------|
| Sodium chloride (oven dried)          | 100 ml vol. flask                   |
| (9) 50 ml vol. flasks                 | (22) plastic snap cap vials (45 ml) |
| 10 ml pipette tips & electric pipette | DI water                            |
| Atomic emission spectrophotometer AE  | (1) 100ml snap cap vial (100ml)     |
| 4% Potassium (KCl)                    | tap water                           |

### Procedure:

- I. Make 100 ml of 1000 ppm Na in DI water.
  - II. Make 50 ml of .001, .005, .01, .05, .1, .5, 1, 5, 50 ppm Na standards from 1000 ppm Na standard. This will be made up in DI water.
  - III. Determine emission of samples and standards with the gain set on 1 ppm Na. (without added K)
    - A. Pipette 10 ml of standard, tap water or unknown into separate vials (11 vials)
    - B. Add 10 ml of DI water.
    - C. Turn on AE, light flame and adjust wavelength. (Follow directions on instrument) Set the gain using 1 ppm Na. (While aspirating 1 ppm Na press EHT and then Zero.)
    - D. Zero AE using DI water.
    - E. Record three readings for each solution (Standards, tap water and unknown).\*
    - F. Graph results and determine Na concentration in the unknown and tap water.
  - IV. Determine emission of samples and standards with the gain set on 50 ppm Na. (without added K)
    - A. Set the gain using 50 ppm Na. (While aspirating 50 ppm Na press EHT and then zero.)
    - B. Zero AE using DI water.
    - C. Record three readings for each solution (Standards, tap water and unknown).\*
    - D. Graph results and determine Na concentration in unknown and Tap water.
  - V. Determine emission of samples and standards with the gain set on 1 ppm Na. (with added K)
    - A. Pipette 10 ml of standard or unknown into a vials.(11 tubes)
    - B. Add 10 ml of 1% K.
    - C. Turn on AE, light flame and adjust wavelength. (Follow directions on instrument) Set the gain using 1 ppm Na. (While aspirating 1 ppm Na press EHT and then zero.)
    - D. Zero AE using DI water.
    - E. Record three readings for each solution (Standards, tap water and unknown).\*
    - F. Graph results and determine Na concentration in unknown and Tap water.
  - VI. Determine emission of samples and standards with the gain set on 50 ppm Na. (with added K)
    - A. Set the gain using 50 ppm Na. (While aspirating 50 ppm Na press EHT and then zero.)
    - B. Zero AE using DI water.
    - C. Record three readings for each solution (Standards, tapwater and unknown).\*
    - D. Graph results and determine Na concentration in unknown and Tap water.
- \* **Note:** Don't use standard values greater than 1.000 Abs when creating your graph. If tapwater or unknown Abs readings are greater than 1.000 Abs, dilute them and repeat readings. AE = Atomic Emission
- Questions:**
1. What is the resolution of the instrument in Absorbance units, and ppm Na?
  2. What is the resolution of the procedure in ppm Na?
  3. What is the detection limit of the AE in ppm Na?
  4. Did using the K effect your results? How?
  5. Discuss the precision of your measurements?
  6. Discuss the working range of the AE.
  7. What is the working range of the procedure?
  8. How did changing the gain of the AE with 1ppm Na and 50 ppm Na affect your results?

