



Arsenic - Gold Electrode

(Standard Comparison Method) - Application 3

Application 3 involves the detection of arsenic ions in water samples using an instrument connected to a computer running software. It employs a gold electrode and linear sweep voltammetry, utilizing the standard comparison method for detection. This method is suitable for surface water with low organic content and relatively clean conditions, as organic matter may adhere to the metal surface and impede detection. Therefore, wastewater or natural water with heavier contamination requires pretreatment, such as digestion, before detection can be performed.

Reproducibility: When detecting solutions containing the target metal at 100 ppb, the standard deviation is less than 5% (with more than 5 measurements).

Peak Position:

As: 50 mV to 450 mV vs. Ag/AgCl

Electrolyte: Arsenic electrolyte.

Standard Solution: Arsenic standard solution.

Other Reagents: Adjusting Solution B; Ultrapure water.

Reagent Addition Reference:

Reagent Addition		Arsenic Electrolyte	Ultrapure Water	Arsenic Standard Solution	Arsenic Additive	Water Sample
Blank Sample		10 mL	10 mL	0	100µL	0
Arsenic Standard Sample (Range)	10 ppb(1~50ppb)	10 mL	10 mL	10 µL	100µL	0
	50 ppb(5~200ppb)	10 mL	10 mL	50 µL	100µL	0
	200ppb(10~500ppb)	10 mL	10 mL	200 µL	100µL	0
	1 ppm	10 mL	9 mL	1 mL	100µL	0
Sample to be Tested		10 mL	0	0	100µL	10 mL

Analysis Steps: The YSHM-200W analyzer is user-friendly. The following are the basic steps required for both standalone and computer-controlled analyses. These seven main steps are:

1. Electrode Pre-treatment: To detect arsenic, use a gold electrode. First, polish and clean the gold electrode on a polishing cloth, then immerse it in Adjusting Solution B for a few minutes. Rinse the electrode with ultrapure water as described in the manual. Next, fill the reference electrode inner tube with fresh 3 M KCl solution and soak it in the soaking solution (saturated KCl solution) for a few minutes. Rinse the reference electrode with ultrapure water. Place all three electrodes in their respective positions in the electrode device and connect them with the corresponding colored plugs.

2. Electrode Maintenance: Pour Adjusting Solution B into the "Maintenance Liquid" analysis cup and perform the "Electrode Maintenance" operation under the "Gold Adjustment" submenu. After completion, promptly return the Adjusting Solution B to the bottle for reuse.

3. Preparation of Blank, Standard, and Test Samples: Place the analysis cup sequentially on the analysis stand and prepare the blank sample, standard sample, and test sample according to the order specified in the table.

4. Detect the Blank Sample: Confirm that the electrolyte, electrodes, and analysis cup are free from contamination.

5. Select the Target Metal and Range: Analyze the standard sample with a known concentration.

6. Analyze the Test Water Sample: The instrument will compare the signal obtained from the test water sample with the standard sample and display the analysis results.

7. Electrode Cleaning: Polish the gold electrode to thoroughly clean it. Dispose of the reference electrode inner tube liquid and refill it before the next test to prevent degradation of the reference electrode.

Notes:

- ① Ensure correct connection of the three electrodes; avoid incorrect connections (color-coded). When handling the gold electrode, do not polish it on sandpaper, as this may cause unstable detection results.

- ② After calibrating with the standard sample, up to about ten sample analyses can be performed. If the repeatability deteriorates, consider recalibrating the standard sample (recalibration is required after 3-5 tests for arsenic). Do not rinse the same test sample in ultrapure water; rinse in ultrapure water when switching between different test samples.

- ③ The acidity of the test sample should be close to neutral; high acidity may affect the accuracy of the detection results.

- ④ After use, place the maintenance liquid, rinse water, blank sample, standard sample, and test sample back in their respective positions on the analysis stand to avoid confusion.

- ⑤ When adding liquids, avoid generating bubbles in the analysis cup. Add the liquid along the wall of the cup using a pipette tip and handle carefully to prevent liquid spillage and impact on test results.