

VA Application Note V-210

# Total arsenic in mineral water

Straightforward determination by voltammetry on a gold microwire electrode



Arsenic is ubiquitous in the earth's crust in low concentrations. Elevated levels can be found in mineral deposits and ores. Arsenic from such deposits leaches into the groundwater in the form of arsenite ( $\text{AsO}_3^{3-}$ ) and arsenate ( $\text{AsO}_4^{3-}$ ), causing its contamination. In addition to the arsenic originating from natural sources, industry and agriculture contribute to the contamination to a lower extent. The guideline value for inorganic total arsenic in the World Health Organization's «Guidelines for Drinking-water Quality» is set to 10  $\mu\text{g/L}$ .

With a limit of detection (LOD) of 0.9  $\mu\text{g/L}$ , **anodic stripping voltammetry** is a viable, less sophisticated alternative to atomic absorption spectroscopy (AAS) for the determination of arsenic. While AAS (and competing methods) can only be performed in a laboratory, anodic stripping voltammetry can be used conventionally in the laboratory or alternatively in the field using the 946 Portable VA Analyzer. The determination is carried out on the scTRACE Gold electrode.

# Method description

## Sample

- Bottled mineral water

## Instrument

946 Portable VA Analyzer (scTRACE Gold version)

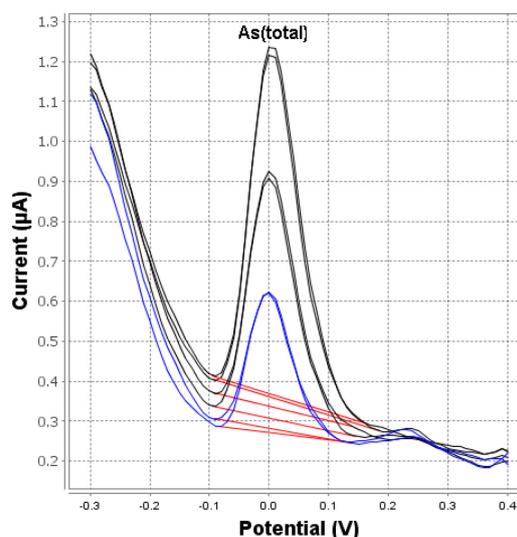


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Deposition potential	-1 V
Deposition time	60 s
Start potential	-0.3 V
End potential	0.4 V
Peak potential As	0 V

## Example



## Results

Sample	Concentration [µg/L]
Bottled mineral water	4.4

## Comments

The limit of detection of the method is about 0.9 µg/L.

As(III) and As(V) have a different sensitivity. When both species are present in a sample As(III) has to be oxidized to As(V) by the addition of  $\text{KMnO}_4$  solution in order to guarantee correct results for total arsenic.

## References

Application Bulletin 416: Determination of arsenic in water with the scTRACE Gold

## Electrodes

scTRACE Gold	6.1258.000
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## Solutions

Supporting electrolyte	Sulfamic acid, citric acid, KCl
$\text{KMnO}_4$ solution	$\text{KMnO}_4$ in water
As(V) standard addition solution	$\beta(\text{As(V)}) = 1 \text{ mg/L}$

## Analysis

15 mL sample and 3 mL electrolyte are added into the measuring vessel. The concentration is determined with two standard additions.

## Parameters

Mode	SQW – Square wave
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