



License ID 459712
Client ID met0348
User Metrohm

Program version viva 2.0 - 54
2015-09-03 15:45:40 UTC+2

Method parameters

Method Template Cd and Pb by DP-ASV
semiautomated
Method saving date 2015-09-03 15:39:39 UTC+2
Method version 1
Method group Main group
Method status original
Method saved by (full name) Metrohm International Headquarters
Method saved by (short name) Metrohm

START

Main track

General

Workplace view

Current view on

Track view for live window

Live display 1 Main track

Live display 2 Main track

Electrode test on

Application note

Sample data variables

| Name | Type | Assignment | Fixed value | Comment | Monitoring |
|--------------------|--------|--------------------|-------------|-------------------------|------------|
| ID1 | Text | ID1 | | Sample identification 1 | off |
| ID2 | Text | ID2 | | Sample identification 2 | off |
| ID3 | Text | ID3 | | Sample identification 3 | off |
| Sample type | Text | Sample type | | Sample type | off |
| Sample amount | Number | Sample amount | | Sample amount | off |
| Sample amount unit | Text | Sample amount unit | | Sample amount unit | off |

Name ID1

Type Text

Assignment on, ID1

Fixed value off,

Check at start on

Comment Sample identification 1

Name ID2

Type Text

Assignment on, ID2

Fixed value off,

Check at start on



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Comment Sample identification 2

Name **ID3**

Type Text

Assignment on. ID3

Fixed value off.

Check at start on

Comment Sample identification 3

Name **Sample type**

Type Text

Assignment on. Sample type

Fixed value off.

Check at start on

Comment Sample type

Name **Sample amount unit**

Type Text

Assignment on. Sample amount unit

Fixed value off.

Check at start on

Comment Sample amount unit

Name **Sample amount**

Type Number

Assignment on. Sample amount

Fixed value off.

Check at start on

Comment Sample amount

Variable monitoring off

Lower limit

Upper limit

Message

Display message on

Record message on

Message by e-mail off

E-mail template

Subject Message from viva - method 'New method 3' - command 'Main track'

Acoustic signal off

Action off

Cancel determination on

Cancel determination and series off

CALL

Call sample



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| Call text | Track name | Sample type | Condition |
|-------------|------------|-------------|-----------|
| Call sample | Sample | off Sample | off |

CALL

Call additions

| Call text | Track name | Sample type | Condition |
|----------------|-------------------|-------------|-----------|
| Call additions | Standard addition | off Sample | off |

VA TRACK VA track

Return immediately off

LOOP

Replications

Stop criteria

Max. run number on
Max. run number 2
Maximum run time off
Signal assessment for DT off
Condition off

DP

ASV

General/Hardware

Device

Device name not defined
Device type 884 Professional VA

Sensors/Electrodes

Working electrode MME
Sensor type MME
Operating mode HMDE
Drop size 4
Reference electrode Reference electrode
Auxiliary electrode Auxiliary electrode
Electrode test on

Stirrer

Stirring rate 2000 min⁻¹

Pretreatment

Stirring time 5.0 s

Cyclovoltammetric pretreatment

Start potential -1.2 V
Vertex potential -0.100 V
Sweep rate 1 V/s
Cycles off
Duration - s

Potentiostatic pretreatment

Potential 1 -0.9 V
Waiting time 1 60.0 s



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Potential 2 off V
Waiting time 2 0.0 s
Potential 3 off V
Waiting time 3 0.0 s
Potential 4 off V
Waiting time 4 0.0 s
Potential 5 off V
Waiting time 5 0.0 s
Equilibration time 5.0 s

Sweep

Start potential -0.8 V
End potential -0.2 V
Potential step 0.006 V
Potential step time 0.1 s
Sweep rate 0.060 V/s
Pulse amplitude 0.05 V
Pulse time 0.04 s
Measuring time 0.02 s
Sweep duration 10.00 s

Post-treatment

Cleaning

Cleaning potential off V
Cleaning time 0.0 s

Standby potential

Standby potential off V

Potentiostat

Current measuring range

Highest range 2 mA
Lowest range 2 μ A
Automatically select optimum current measuring range on

TRACK

Sample

Return immediately off
Delete old data off

ADD SAMPLE

Add sample

Addition

Add manually on
Display standard message on
Display message defined by the user off
Already added off
Add with dosing device off

ADD AUX

Add electrolyte

Auxiliary solution

Solution Electrolyte
Volume 1 mL



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Include volume in calculation on
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate maximum mL/min
Filling rate maximum mL/min

ELECTRODE TEST

Device
Device name not defined
Device type 884 Professional VA
Sensors/Electrodes
Working electrode MME
Sensor type MME
Stirrer
Stirring rate 2000 min⁻¹

STIR & PURGE

Initial purge
Device
Device name not defined
Device type 884 Professional VA
Stir
Stirring rate 2000 min⁻¹
Switch on on
Switch off off
Duration off
Purge
Switch on off
Switch off off
Duration on
Time 300 s

CALL VA

Measure sample
Call text Measure sample
Track name VA track
Condition off

TRACK

Standard addition
Return immediately off
Delete old data off

LOOP

Variations
Stop criteria
Max. run number on
Max. run number 2
Maximum run time off



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Signal assessment for DT off
Condition off

ADD STD Add standard

Standard
Solution Standard
Addition increments
Number 1
Addition volume 1 0.100 mL
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate 2.0 mL/min
Filling rate maximum mL/min

STIR & PURGE Addition purge

Device
Device name not defined
Device type 884 Professional VA
Stir
Stirring rate 2000 min⁻¹
Switch on on
Switch off off
Duration off
Purge
Switch on off
Switch off off
Duration on
Time 30 s

CALL VA Measure additions

Call text Measure additions
Track name VA track
Condition off

TRACK Shut off

Return immediately off
Delete old data off

STIR & PURGE STIR & PURGE OFF

Device
Device name not defined
Device type 884 Professional VA
Stir
Stirring rate 2000 min⁻¹
Switch on off
Switch off on



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Duration off
Purge
Switch on off
Switch off on
Duration off

**MAIN
VALVE**

N2 OFF

Device

Device name not defined
Device type 884 Professional VA

Action

Open off
Close on

TRACK

DU Standard

Return immediately off
Delete old data off

LQH

Fill DU Standard

General/Hardware

Dosing device

Dosing unit 2 mL Standard

Parameters

Function Fill
Port 2
Rate maximum mL/min

TRACK

DU Electrolyte

Return immediately off
Delete old data off

LQH

Fill DU Electrolyte

General/Hardware

Dosing device

Dosing unit 5 mL Electrolyte

Parameters

Function Fill
Port 2
Rate maximum mL/min

EXIT

Exit track

CALL

Exit shut off

| Call text | Track name | Sample type | Condition |
|---------------|------------|-------------|-----------|
| Exit shut off | Shut off | off Sample | off |



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CALL Fill Dosing Units

| Call text | Track name | Sample type | | Condition |
|---------------------|----------------|-------------|--------|-----------|
| Fill DU Standard | DU Standard | off | Sample | off |
| Fill DU Electrolyte | DU Electrolyte | off | Sample | off |

ERROR Error track

CALL Error shut off

| Call text | Track name | Sample type | | Condition |
|----------------|------------|-------------|--------|-----------|
| Error shut off | Shut off | off | Sample | off |

Evaluation parameters

General

ASV

Data processing

Smoothing 1
Reversed peaks off

Curve evaluation

Fixed point evaluation off

Substances

ASV

Substances - Recognition

| Substance | Active | Characteristic potential | Tolerance | Min. width | Max. width | Min. measured quantity |
|-----------|--------|--------------------------|-----------|------------|------------|------------------------|
| Cd | on | -0.58 V | 0.05 V | 0.01 V | 0.5 V | 200 pA |
| Pb | on | -0.38 V | 0.05 V | 0.01 V | 0.5 V | 200 pA |

ASV

Substances - Baseline

| Substance | Baseline type | Start base point | End base point |
|-----------|---------------|------------------|----------------|
| Cd | Linear | Automatically | Automatically |
| Pb | Linear | Automatically | Automatically |

Standards

Standards

Name Standard

Cd 0.1 mg/L



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Name Standard

Pb 1.0 mg/L

Calibration

General

Calibration method Standard addition
Blank value correction with evaluation off
quantity

ASV

Calibration curves

| Substance | Evaluation quantity | Curve type | Weighting |
|-----------|---------------------|-------------------|-----------|
| Cd | Height | Linear regression | on |
| Pb | Height | Linear regression | on |

Results

Substance concentration in the sample

ASV

| Substance | Decimal places | Assignment |
|-----------|----------------|------------|
| Cd | 2 | RS01 |
| Pb | 2 | RS02 |

Results

Additional results

| Result | Places | Prefix | Unit |
|--|--------|--------|------|
| Peak potential | 3 | | V |
| Height | 2 | # | A |
| RSD of the heights of all replications | 1 | | % |
| Area | 2 | # | C |
| RSD of the areas of all replications | 1 | | % |
| Start base point | 3 | | |
| End base point | 3 | | |
| Standardized area | 3 | | |
| Standardized height | 3 | | |
| Total volume | 3 | # | L |
| Zero-order coefficient | 3 | | |
| First-order coefficient | 3 | | |
| Second-order coefficient | 3 | | |
| Fourth-order coefficient | 3 | | |



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| Result | Places | Prefix | Unit |
|--|--------|--------|------|
| Coefficient of determination | 5 | | |
| Substance concentration in measuring vessel | 2 | # | |
| RSD of the substance concentration in measuring vessel | 1 | | % |
| Amount of substance | 2 | # | |
| RSD of the substance concentration in the sample | 1 | | % |
| Effective addition volume of the standard solution for the evaluation ratio | 2 | # | L |
| RSD of the effective addition volume of the standard solution for the evaluation ratio | 1 | | % |
| Calibration factor DT | 2 | # | |
| RSD of the calibration factor DT | 1 | | % |
| Effective addition volume of the sample solution for the evaluation ratio | 2 | # | L |
| RSD of the effective addition volume of the sample solution for the evaluation ratio | 1 | | % |

Database

Name database viva