



License ID 459712
Client ID 001-NBK-02361
User Metrohm

Program version viva 2.1 - 60
2020-07-08 11:31:59 UTC+2

Method parameters

Method Brightener determination (CVS, MLAT),
automated
Method saving date 2020-07-08 11:18:52 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 check on

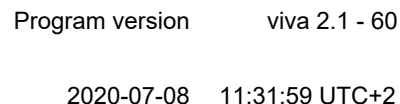
Application note

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 position | Number | Sample position | | Sample position number | 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



Name Sample amount

AB-403: MVA-23 - Determination of brightener by MLAT

| | |
|---------------------|------------------------------------|
| Call text | Conditioning in intercept solution |
| Track name | VA track |
| Stop criteria | |
| Evaluation quantity | on |
| Voltammetry command | CVS |
| Substance | Brightener |
| Standard deviation | 2 % |
| Number of runs | on |
| Number of runs | 20 |
| Action | Cancel command |



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Run time off
Condition off

CALL INTERCEPT

CALL INTERCEPT

Call text Measure intercept
Track name VA track
Condition off

CALL

Sample addition

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

ADD AUX

ADD Suppressor

Auxiliary solution

Solution Suppressor concentrate
Volume 0.2 mL
Include volume in calculation on

Addition

Add manually off
Already added off
Add with dosing device on
Dosing rate 2 mL/min
Filling rate maximum mL/min

CALL VA

CALL SAMPLE

Call text Measure sample
Track name VA track
Condition off

CALL

CALL Addition loop

| Call text | Track name | Sample type | Condition |
|---------------|---------------|-------------|-----------|
| Addition loop | Addition loop | off Sample | off |

CALL

CALL Rinse needle

| Call text | Track name | Sample type | Condition |
|--------------|------------------------|-------------|-----------|
| Rinse needle | Go to rinsing position | off Sample | off |

CALL

CALL Final rinsing

| Call text | Track name | Sample type | Condition |
|---------------|---------------|-------------|-----------|
| Rinsing cycle | Rinsing cycle | off Sample | off |



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VA TRACK VA track

Return immediately off

CVS

CVS

General/Hardware

Device

Device name not defined

Device type 884 Professional VA

Sensors/Electrodes

Working electrode RDE

Sensor type RDE/SSE

Reference electrode Reference electrode

Auxiliary electrode Auxiliary electrode

Electrode check on

Stirrer

Stirring rate 2500 min⁻¹

Hydrodynamic measurement on

Pretreatment

Stirring time 5.0 s

Cyclovoltammetric pretreatment

Start potential 0.2 V

Vertex potential 1.625 V

Sweep rate 1 V/s

Cycles off

Duration - s

Potentiostatic pretreatment

Potential 1 off V

Waiting time 1 0.0 s

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 1.625 V

1st vertex potential -0.3 V

2nd vertex potential 1.625 V

Potential step 0.006 V

Potential step time 0.040 s

Sweep rate 0.15 V/s

Preparation cycles 1

Measuring cycles 2



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Sweep duration 77.76 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 224 mA

Lowest range 20 µA

TRACK

Addition loop

Return immediately off

Delete old data off

LOOP

LOOP

Stop criteria

Max. run number on

Max. run number 2

Maximum run time off

Signal assessment for DT off

Condition off

ADD STD

ADD STD

Standard

Solution Brightener concentrate

Addition increments

Number 1

Addition volume 1 0.015 mL

Addition

Add manually off

Already added off

Add with dosing device on

Dosing rate 2.0 mL/min

Filling rate maximum mL/min

CALL VA

CALL ADDITION

Call text Standard addition

Track name VA track

Condition off

TRACK

Add sample automatically

Return immediately off

Delete old data off

CALL

CALL Next sample



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| | | | | |
|-------------------|---|------------------|-------------|--|
| | Call text | Track name | Sample type | Condition |
| | Next sample | Next sample | off Sample | off |
| CALL | Transfer sample | | | |
| | Call text | Track name | Sample type | Condition |
| | Peristaltic pump ON | Peristaltic pump | off Sample | off |
| ADD SAMPLE | ADD Sample | | | |
| | Addition | | | |
| | Add manually | | | off |
| | Already added | | | on |
| | Add with dosing device | | | off |
| TRACK | Next sample | | | |
| | Return immediately | | | off |
| | Delete old data | | | off |
| MOVE | MOVE to sample position | | | |
| | Device | | | |
| | Device name | | | not defined |
| | Device type | | | 858.0020 Professional Sample Processor |
| | Target | | | |
| | Tower | | | 1 |
| | Move | | | Sample position |
| | Beaker test | | | |
| | Display message | | | on |
| | Cancel determination | | | off |
| | Cancel determination and series | | | off |
| | Parameters | | | |
| | Shift rate | | | 20 °/s |
| | Shift direction | | | auto |
| | Swing rate | | | 55 °/s |
| LIFT | Needle → Work position | | | |
| | Device | | | |
| | Device name | | | not defined |
| | Device type | | | 858.0020 Professional Sample Processor |
| | Target | | | |
| | Tower | | | 1 |
| | Lift position | | | Work position mm |
| | Parameters | | | |
| | Lift rate | | | 25 mm/s |
| TRACK | Go to rinsing position | | | |
| | Return immediately | | | off |



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Delete old data off

CALL Empty measuring vessel

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

MOVE MOVE to rinsing position

Device

Device name not defined

Device type 858.0020 Professional Sample Processor

Target

Tower 1

Move Rack position

Number = 'SD.Sample position' +28

Beaker test

Display message on

Cancel determination off

Cancel determination and series off

Parameters

Shift rate 20 °/s

Shift direction auto

Swing rate 55 °/s

LIFT Needle → Work position

Device

Device name not defined

Device type 858.0020 Professional Sample Processor

Target

Tower 1

Lift position Work position mm

Parameters

Lift rate 25 mm/s

CALL Transfer rinsing solution

| Call text | Track name | Sample type | Condition |
|---------------------|------------------|-------------|-----------|
| Peristaltic pump ON | Peristaltic pump | off Sample | off |

TRACK Intercept VMS

Return immediately off

Delete old data off

ADD AUX ADD VMS intercept

Auxiliary solution

Solution VMS

Volume 30 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

TRACK Intercept suppressor

Return immediately off

Delete old data off

ADD AUX ADD Suppressor intercept

Auxiliary solution

Solution Suppressor concentrate

Volume 1.2 mL

Include volume in calculation on

Addition

Add manually off

Already added off

Add with dosing device on

Dosing rate 2 mL/min

Filling rate maximum mL/min

TRACK Rinsing cycle

Return immediately off

Delete old data off

LOOP LOOP Rinsing

Stop criteria

Max. run number on

Max. run number 2

Maximum run time off

Signal assessment for DT off

Condition off

CALL CALL Drain

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

CALL CALL Rinse

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

Peristaltic pump



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TRACK Return immediately off

Delete old data off

PUMP Peristaltic pump ON

Device

Device name not defined

Device type 858.0020 Professional Sample Processor

Pumps

Tower 1

Pump(s) Peristaltic

Rate 10

Action

Switch on off

Switch off off

Duration on

Time 300.0 s

TRACK Rinse

Return immediately off

Delete old data off

PUMP PUMP Rinse

Device

Device name not defined

Device type 858.0020 Professional Sample Processor

Pumps

Tower 1

Pump(s) 2

Action

Switch on off

Switch off off

Duration on

Time 9 s

TRACK Drain

Return immediately off

Delete old data off

PUMP PUMP Drain

Device

Device name not defined

Device type 858.0020 Professional Sample Processor

Pumps

Tower 1

Pump(s) 1

Action

Switch on off



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Switch off off
Duration on
Time 50 s

**SERIES
START** **Series start track**

RACK **RACK INIT**

Device
Device name not defined
Device type 858.0020 Professional Sample Processor
Rack test on
Test rack 6.2041.450

EXIT **Exit track**

PUMP **PUMPS OFF**

Device
Device name not defined
Device type 858.0020 Professional Sample Processor
Pumps
Tower 1
Pump(s) 1+2
Action
Switch on off
Switch off on
Duration off
Time 8.0 s

LIFT **Needle → Shift position**

Device
Device name not defined
Device type 858.0020 Professional Sample Processor
Target
Tower 1
Lift position Shift position mm
Parameters
Lift rate 25 mm/s

LQH **FILL VMS**

General/Hardware

Dosing device
Dosing unit 50 mL VMS

Parameters

Function Fill
Port 2
Rate maximum mL/min



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LQH FILL Brightener
General/Hardware
Dosing device
Dosing unit 2 mL Brightener
Parameters
Function Fill
Port 2
Rate maximum mL/min

LQH FILL Suppressor
General/Hardware
Dosing device
Dosing unit 2 mL Suppressor
Parameters
Function Fill
Port 2
Rate maximum mL/min

ERROR Error track

PUMP PUMPS OFF
Device
Device name not defined
Device type 858.0020 Professional Sample Processor
Pumps
Tower 1
Pump(s) 1+2
Action
Switch on off
Switch off on
Duration off
Time 8.0 s

Evaluation parameters

General
CVS
Data processing
Smoothing 1
Reversed peaks off
Curve evaluation
Fixed point evaluation off
Substances
CVS
Substances - Recognition



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| Substance | Active | Characteristic potential | Tolerance | Min. width | Max. width | Min. measured quantity | Sweep direction |
|------------|--------|--------------------------|-----------|------------|------------|------------------------|-----------------|
| Brightener | on | 0.1 V | 0.2 V | 0.01 V | 0.5 V | 200 pA | anodic |

CVS

Substances - Baseline

| Substance | Baseline type | Start base point | End base point |
|------------|---------------|------------------|----------------|
| Brightener | Horizontal | 0.3 V | -0.1 V |

Standards

Standards

Name Brightener concentrate

Brightener 1000 mL/L

Calibration

General

Calibration method MLAT
Blank value correction with evaluation off
quantity

CVS

Calibration curves

| Substance | Evaluation quantity | Curve type | Weighting |
|------------|---------------------|-------------------|-----------|
| Brightener | Area | Linear regression | on |

Results

Substance concentration in the sample

CVS

| Substance | Decimal places | Assignment |
|------------|----------------|------------|
| Brightener | 2 | RS01 |

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 |



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| Result | Places | Prefix | Unit |
|--|--------|--------|------|
| 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 | | |
| 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