



License ID 459712
Client ID met0348
User Metrohm

Program version viva 2.0 - 49
2015-05-05 07:15:20 UTC+2

Method parameters

Method AB 420 smartDT
Method saving date 2015-05-04 14:03:05 UTC+2
Method version 1
Method group _examples
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

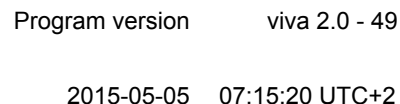
Electrode test on

Application note

smartDT (dilution titration with intelligent addition volumes) For more details see Application Bulletin 420. Comments - Recommended value «Initial volume in mL»: 25% of the total addition volume at evaluation ratio in the calibration (range 0.01 ... 1 mL) - Recommended value «Minimum volume in mL»: 5% ... 7% of the total addition volume at evaluation ratio in the calibration (range 0.01 ... 0.1 mL) Method sequence Track Main track START command contains additional sample data «Initial volume in mL» (ID4; type: number) and «Minimum volume in mL» (ID5; type: number). Volumes (in mL) have to be defined on the Workplace and are used as variables in the in the commands ADD STD and ADD SAMPLE DT. Track DT Determination ADD SAMPLE DT (SAMPLE smartDT) first addition of volume as defined for «Initial volume in mL», then addition volume calculated based on «Minimum volume in mL» and the predicted volume at the evaluation ratio WAIT (DOC volume smartDT sample) output of the calculated addition volumes «SAMPLE smartDT» in the message subwindow Track DT Calibration ADD STD (STANDARD smartDT) first addition of volume as defined for «Initial volume in mL», then addition volume calculated based on «Minimum volume in mL» and the predicted volume at the evaluation ratio WAIT (DOC volume smartDT calib) output of the calculated addition volumes «STANDARD smartDT» in the message subwindow

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
Initial volume in mL	Number	ID4		Initial volume in mL	on
Minimum volume in	Number	ID5		Minimum volume in mL	on



Name	Sample position
Type	Number
Assignment	on. Sample position
Fixed value	off.
Check at start	on
Comment	Sample position number
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 'AB 420 smartDT new' - command 'Main track'
Acoustic signal	off
Action	off



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Cancel determination on
Cancel determination and series off

Name **Initial volume in mL**
Type Number
Assignment on. ID4
Fixed value off.
Check at start on
Comment Initial volume in mL
Variable monitoring on
Lower limit 0.01
Upper limit 1
Message The volume specified for «Initial volume in mL» is
smaller than 0.01 mL or bigger than 1 mL. Please
change the entry on the «Workplace» and restart
the determination.

Display message on
Record message on
Message by e-mail off
E-mail template
Subject Message from viva - method 'AB 420 smartDT new' - command
'Main track'

Acoustic signal off
Action on
Cancel determination on
Cancel determination and series off

Name **Minimum volume in mL**
Type Number
Assignment on. ID5
Fixed value off.
Check at start on
Comment Minimum volume in mL
Variable monitoring on
Lower limit 0.01
Upper limit 0.1
Message The volume specified for «Minimum volume in mL»
is smaller than 0.01 mL or bigger than 0.1 mL.
Please change the entry on the «Workplace» and
restart the determination.

Display message on
Record message on
Message by e-mail off
E-mail template
Subject Message from viva - method 'AB 420 smartDT new' - command
'Main track'
Acoustic signal off



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Action on
Cancel determination on
Cancel determination and series off

Command comment

AB 420: smartDT - Determination of suppressor by DT with intelligent addition volumes

CALL Add VMS

Call text	Track name	Sample type	Condition
Add VMS	ADD VMS	off Sample	off

CALL COND

CALL COND

Call text Conditioning in VMS
Track name VA track
Stop criteria
Evaluation quantity on
Voltammetry command CVS
Substance Suppressor
Standard deviation 0.5 %
Number of runs on
Number of runs 20
Action Cancel command
Run time off
Condition off

CALL VMS CALL VMS

Call text Measure VMS
Track name VA track
Condition off

CALL Sample or standard?

Call text	Track name	Sample type	Condition
DT Determination	DT Determination	Sample	off
DT Calibration	DT Calibration	on Standard	off

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



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Sensor type RDE/SSE
Reference electrode Reference electrode
Auxiliary electrode Auxiliary electrode
Electrode test 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 -0.175 V
2nd vertex potential 1.625 V
Potential step 0.006 V
Potential step time 0.060 s
Sweep rate 0.100 V/s
Preparation cycles 1
Measuring cycles 2
Sweep duration 109.08 s
Post-treatment
Cleaning
Cleaning potential off V
Cleaning time 0.0 s
Standby potential
Standby potential off V
Potentiostat
Current measuring range



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Highest range 224 mA

Lowest range 20 µA

TRACK DT Determination

Return immediately off

Delete old data off

LOOP Sample addition

Stop criteria

Max. run number off

Maximum run time off

Signal assessment for DT on

Voltammetry command CVS

Substance Suppressor

Signal ratio Q/Q(0) = 'ED.Calibration.CVS.Suppressor.EVRATIO'
- 0.01

Condition off

ADD SAMPLE smartDT

SAMPLE DT

Addition increments

Number 2

Addition volume 1 = 'SD.Initial volume in mL' mL

Addition volume 2 = 'SD.Minimum volume in mL' + (Case(mL
Abs('RS.CVS.Suppressor.VEFFSMPL' *
1000) <= 'SD.Initial volume in mL' * 7 ; Abs
('RS.CVS.Suppressor.VEFFSMPL' * 1000)
; 'SD.Initial volume in mL' * 7 ; 'SD.Initial
volume in mL' * 7) * ((Abs('RS.CVS.
Suppressor.VAR{ Round('SAMPLE smartDT.
ACO' - 1) }.REP{1}.AREANORM' - 'ED.
Calibration.CVS.Suppressor.EVRATIO')) /
5))

Addition

Add manually off

Add with dosing device on

Dosing unit 2 mL Standard or sample

Dosing rate 2.0 mL/min

Filling rate maximum mL/min

WAIT DOC volume smartDT sample

Wait

Stop track and waiting for [Continue] off

Stop all tracks and waiting for [Continue] off

Waiting time on

Time 0

Unit s

Message

Addition volume [= Round('Sample addition.
LCO')]: [= Round('SAMPLE smartDT.VOL' *
1000 * 1000) / 1000] mL

Record message on



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Message by e-mail off
Acoustic signal off

CALL VA CALL SAMPLE

Call text Measure sample
Track name VA track
Condition off

TRACK DT Calibration

Return immediately off
Delete old data off

LOOP Standard addition

Stop criteria
Max. run number off
Maximum run time off
Signal assessment for DT on
Voltammetry command CVS
Substance Suppressor
Signal ratio Q/Q(0) ='ED.Calibration.CVS.Suppressor.EVRATIO' -
0.01
Condition off

ADD STD STANDARD smartDT

Standard
Solution Standard or sample
Addition increments
Number 2
Addition volume 1 = 'SD.Initial volume in mL' mL
Addition volume 2 = 'SD.Minimum volume in mL' + (Case(mL
Abs('RS.CVS.Suppressor.VEFFSTD' * 1000
) <= 'SD.Initial volume in mL' * 7 ; Abs(
'RS.CVS.Suppressor.VEFFSTD' * 1000) ;
'SD.Initial volume in mL' * 7 ; 'SD.Initial
volume in mL' * 7) * ((Abs('RS.CVS.
Suppressor.VAR{ Round('STANDARD
smartDT.ACO' - 1) }.REP{1}.AREANORM' -
'ED.Calibration.CVS.Suppressor.EVRATIO')
) / 5))
Addition
Add manually off
Already added off
Add with dosing device on
Dosing rate 2.0 mL/min
Filling rate maximum mL/min

WAIT DOC volume smartDT calib

Wait
Stop track and waiting for [Continue] off
Stop all tracks and waiting for [Continue] off



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Waiting time on
Time 0
Unit s
Message Addition volume [= Round('Standard addition.
LCO')]: [= Round('STANDARD smartDT.
VOL' * 1000 * 1000) / 1000] mL
Record message on
Message by e-mail off
Acoustic signal off

CALL VA CALL STANDARD

Call text Measure standard
Track name VA track
Condition off

TRACK ADD VMS

Return immediately off
Delete old data off

ADD AUX ADD VMS

Auxiliary solution
Solution VMS
Volume 50 mL
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

EXIT Exit track

LQH FILL VMS

General/Hardware

Dosing device
Dosing unit 50 mL VMS

Parameters

Function Fill
Port 2
Rate maximum mL/min

LQH FILL Standard or sample

General/Hardware

Dosing device
Dosing unit 2 mL Standard or sample

Parameters

Function Fill



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Port 2
Rate maximum mL/min

Evaluation parameters

General

CVS

Data processing

Smoothing 1
Reversed peaks off

Curve evaluation

Fixed point evaluation off

Substances

CVS

Substances - Recognition

Substance	Active	Characteristic potential	Tolerance	Min. width	Max. width	Min. measured quantity	Sweep direction
Suppressor	on	0.2 V	0.2 V	0.01 V	1 V	200 pA	anodic

CVS

Substances - Baseline

Substance	Baseline type	Start base point	End base point
Suppressor	Horizontal	0.8 V	-0.05 V

Standards

Standards

Name Standard or sample

Suppressor 5 mL/L

Calibration

General

Calibration method DT
Blank value correction with evaluation quantity off

CVS

Calibration curves

Substance	Evaluation quantity	Curve type for standard	Weighting
Suppressor	Area	Linear interpolation	on



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Begin of evaluation standard	Curve type for sample	Begin of evaluation sample	Evaluation ratio
1.1	Linear interpolation	1.1	0.5

Results

Substance concentration in the sample

CVS

Substance	Decimal places	Assignment
Suppressor	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
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