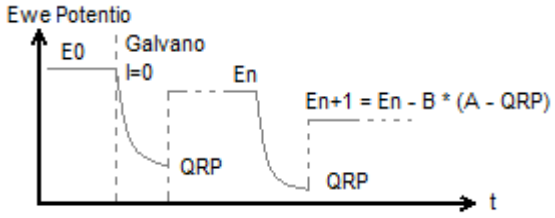
1.0. Special Chronocoulometry Extended

Version 2: par_QRP_time added, 26/10/2012

Technique ID: **174**
ECC file name: **sccx.ecc**
Technique tb (µs): **100**



1.0.1. Description

The Special ChronoCoulometry Extended (SCCX) technique allows the user to adjust the potential of the experiment in a particular manner. This technique contains two periods. First step is a potentiostatic method and the second period is a galvanostatic period. During the galvanostatic period a zero current is applied to the cell which is equivalent to an open circuit period. This couple of steps can be repeated. For each potentiostatic step, the applied potential is calculated according to the following equation :

$En+1 = En - B (A - QRP)$

En+1 is the voltage calculated for the step n+1
En is the voltage applied in the previous potentiostatic step (user sets the initial voltage E0)
QRP is the voltage measured before the end of previous open circuit voltage step. It can be the working electrode potential Ewe or the counter electrode potential Ece
A and B are constants values set by user.

1.0.2. Technique parameters

Technique parameters available for the function BL_LOADTECHNIQUE:

SCCX parameters			
Label	**Description**	**Data types**	**Data range**
par_E0	Initial voltage (V)	Single	-
par_A	A constant	Single	-
par_B	B constant	Single	-
par_QRP_select	QRP select	Integer	0: Ewe, 1: Ece
par_QRP_time	QRP sampling time (s)	Single	[0..par_I0_duration]
par_E_duration	E step duration (s)	Single	≥ 0

SCCX parameters			
Label	**Description**	**Data types**	**Data range**
par_E_dt_rec	Time record condition during the voltage step (s)	Single	≥ 0
par_I0_duration	I=0 step duration (s)	Single	-
par_I0_dt_rec	Time record condition during the I=0 step (s)	Single	-
par_NC	Number of cycles	Integer	[0..2^{31}]
par_RC	record every RC cycles	Integer	[1..N_Cycles]
par_Q_limit_cfg	Limit on charge configuration	Integer	See format below
par_Q_limit_val	Limit on charge value	Single	≥ 0
I_Range	I range	integer	see IRange constants allowed on section 5
E_Range	Ewe range	integer	see ERange constants allowed on section 5
Bandwidth	Bandwidth	integer	see bandwidth constants allowed on section 5

Limit on charge configuration (par_Q_limit_cfg)	**Value**
Disable	0
Stop technique if Q is less than par_Q_limit_val	129
Stop technique if Q is higher than par_Q_limit_val	133

1.0.3. Data format

Data format returned by the function BL_GETDATA :

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	...
t_high	t_low	Ewe	Ece	I	#cycle	mode	Q	t_high	t_low	Ewe	Ece	I	#cycle	mode	Q	...

point #0 *point #1*

The number of points saved in the buffer is returned in the field

TDATAINFOS.NBRAWS. The number of variables defining a point is returned in the field TDATAINFOS.NBCOLS.

1.0.4. Data description and conversion

Data returned into the buffer by BL_GETDATA function are not necessary usable as-is, one may need to convert the data depending on the data type:

- Time:
  The time is calculated with this formula:
  *t (s) = TDataInfos.StartTime + TDataInfos.CurrentValues.TimeBase * ((thigh << 32) + tlow)*

- Single:
  Single precision numbers must be converted with the function BL_CONVERTNUMERICINTOSINGLE

- Integer
  Integer numbers do not need conversion

SCCX data				
Index	**Label**	**Description**	**Type**	**Unit**
0	t_high	Time index high	Time	-
1	t_low	Time index low	Time	-
2	Ewe	Working electrode potential	Single	Volt
3	Ece	Counter electrode potential	Single	Volt
4	I	Working electrode current	Single	Ampere
5	#cycle	Cycle number	Integer	-
6	mode	Mode, 0: potentio, 1: galvano	Integer	-
7	Q	Working electrode charge	Single	Coulomb