



DOC273.53.90668

EZ6000 Trace Metal Analysers

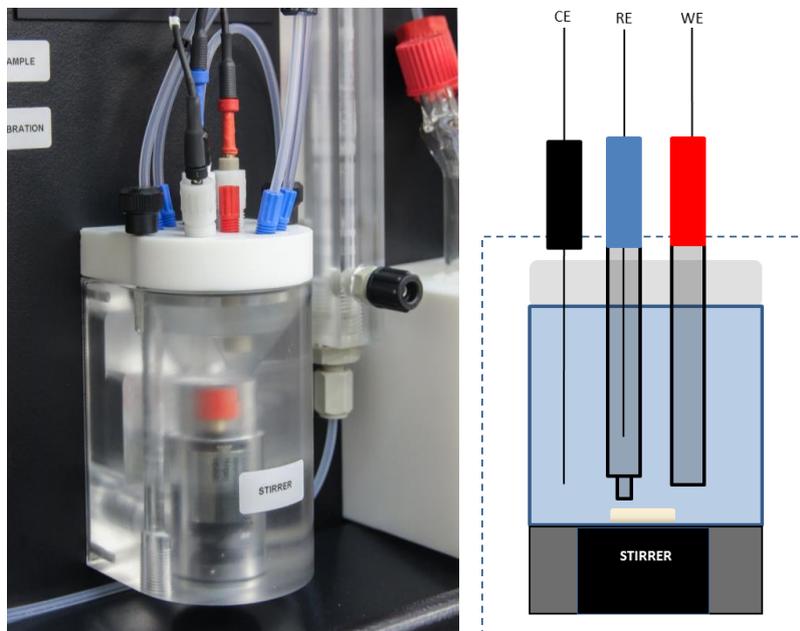
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02/2019, Edition 2

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1. Placement of the electrodes

The positioning of the electrodes in the analysis vessel is crucial in order to obtain accurate and stable results. There are two types of working electrodes, the carbon and gold electrode. The type of working electrode depends on the metal(s) of interest.



CE: Counter electrode – Black

- In the liquid after sampling
- Do not touch the stirrer

WE: Working electrode Carbon – Red

- In the liquid after sampling
- Do not touch the stirrer
- Position electrode above the stirrer at about 0,5 cm*

**The electrode cannot be placed too close to the stirrer, this can damage the mercury film*

WE: Working electrode Gold – Red

- In the liquid after sampling
- Do not touch the stirrer
- Position electrode close to the stirrer**

***In order to remove hydrogen formation from the surface of the gold working electrode*

RE: Reference electrode – Blue

- In the liquid after sampling
- Do not touch stirrer
- Lower than the surface of the WE

1.1 Counter electrode

A new counter electrode must be cut to size (if not already done) in order to fit into the analysis vessel. Use pliers to cut about 1.5 cm.

1.2 Working electrode

It is recommended to polish the working electrode in next cases: starting up a working electrode, if issues occur with the plating/activation procedure, fouling of the surface of the gold electrode.

Polish the electrode

Take a wet paper and clean the working electrode. Polish the electrode using the polishing kit. Rinse the electrode with demineralized water and put it back into the instrument and reconnect the electrode.

1.3 Reference electrode

Detaching the protective cap

Be careful that the transparent heat shrinkable tube is not separated from the glass tube when you pull back the protective cap.

1. Remove the parafilm carefully.
2. Drop distilled water on the transparent heat shrinkable tube toward the black protective cap. Push the cap to moisten inside.
3. Press the transparent contraction heat shrinkable tube firmly with finger, then remove the black protective cap gently by pulling it down. Make sure the porous glass stays in place and no liquid comes out of the electrode.

Attention: If air bubbles are present in the porous glass, slightly flick the electrode to remove the bubbles. The air bubbles may obstruct the liquid conduction between the inner solution and external solution. This might cause abnormal electrode potential or instability of the measurements.

2. Start-up of the working electrode

2.2 Plating of the carbon working electrode

Before starting the analysis with the carbon electrode, the electrode needs to be plated first. A mercury film electrode (MFE) is prepared by plating mercury onto the surface of the carbon electrode. The analysis vessel is cleaned and filled with demineralized water. Next, the buffer and plating solution are added to the sample solution and the plating run is started. After plating, the analysis vessel is rinsed with demineralized water.

Menu path:

→ F1 → Main → Playlist → CH 7 & runs: 1 → Start

Press the Playlist button. Press the drop-down button and select CH7 and insert the number of plating runs: 1. Press the Start button to start the plating run.

The frequency of plating should be repeated about every month when the reagents are replaced. The old MFE is removed by taking a wet paper tissue and cleaning the working electrode and the electrode can be polished. A new MFE is plated by activating the plating procedure on the surface of the cleaned working electrode.

2.3 Activation of the gold working electrode

In order to obtain reproducible results, a new gold electrode should be electrochemically activated.

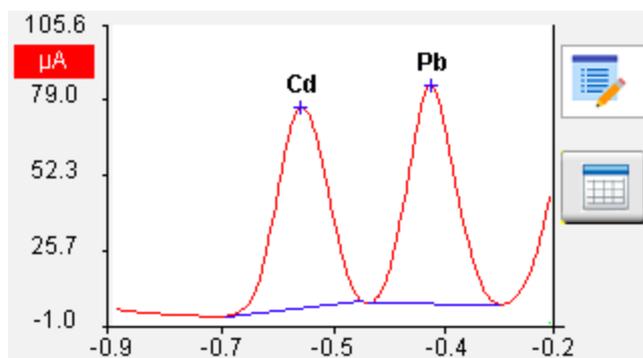
Menu path:

→ F1 → Method: Activation → Playlist → CH 1 & runs: 1 → Start

Press the Playlist button. Press the drop-down button and select CH1 and insert the number of conditioning runs: 1. Press the Start button to start the calibration.

3. Graph

The analytical data for voltammetry comes in the form of a voltammogram which plots the current versus the potential of the working electrode. The voltammogram can be viewed by pressing F7 and selecting in the drop-down menu the parameter(s) of interest.



When pressing the table button the voltammetric parameters are visualised.

Voltammetric table						
	Name	Begin E	End E	Peak E	Area	Height
EP1	Cd	-0.720	-0.500	-0.600	6.690	71.576
EP2	Pb	-0.490	-0.280	-0.390	6.866	77.703

4. Calibration

At the end of each automatic calibration procedure the raw values are written to the calibration table. The calibration table can be accessed under F5, results, select the parameter of interest (e.g. copper) and press the calibration button.

Calibration				Cu
Test solutions				
Conc. REF1:	0.000	ppb		
Conc. REF2:	100.000	ppb		
Raw values				
	Value	Min	Max	
S(REF1):	0.00313	0.00000	3.00000	
S(REF2):	40.00000	10.00000	100.00000	
Accept			Back	>

The calibration concentrations for REF1 and REF2 can be changed by pressing the number. The value for S(REF1) is the raw value for REF1 and the value for S(REF2) is the raw value for REF2. For both the calibration boundaries can be filled in. When the minimum or maximum value is exceeded the calibration alarm will be activated.