DatLab 8.0: CV-Manual

DatLab 8.0:
Cyclic voltammetry manual

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1. Overview

Integration of Q-redox monitoring in the NextGen-O2k extends the analytical and diagnostic power of high-resolution respirometry. The DatLab 8.0: CV-Module is the next step in high-resolution respirometry (HRR), incorporating user-friendly features for cyclic voltammetry (CV) as a part of the Q-Module. CV is a type of electrochemical measurement, applied as a quality control step to (*1*) determine the redox potentials of coenzyme Q2, (*2*) check the quality of the Q-sensor, and (*3*) test the interference of chemicals used in the HRR assay with the Q-sensor. In voltammetry, information about the analyte is obtained by measuring the current as the electric potential varies. In CV, the

electric potential ramps linearly versus time in cyclical phases and is measured between the glassy carbon electrode (GCE) and the Ag/AgCl electrode while the current is detected between the GCE and the platinum electrode. The detected current is plotted versus the applied voltage (GCE's potential) to give the typical cyclic voltammogram trace.

2.   Start DatLab 8.0 for cyclic voltammetry

2.1.   How to start the measurement?

1.   Connect DatLab 8.0 to the O2k by clicking Connect to O2k in the O2k status menu at the bottom right corner.
2.   Select Coenzyme Q in the upper menu and then click on Start Cyclic voltammetry.
3.   Set the desired temperature on the side menu.
4.   Click on Start cyclic voltammetry to start a measurement. The cyclic voltammetry will automatically stop after finishing five cycles.
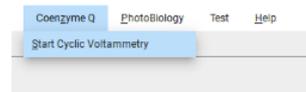
During CV, the data recording interval is 0.1 s and the stirrers are switched off automatically by DatLab 8.0. After finishing CV, DatLab 8.0 automatically sets the data recording interval back to 2 s and starts the stirrers.
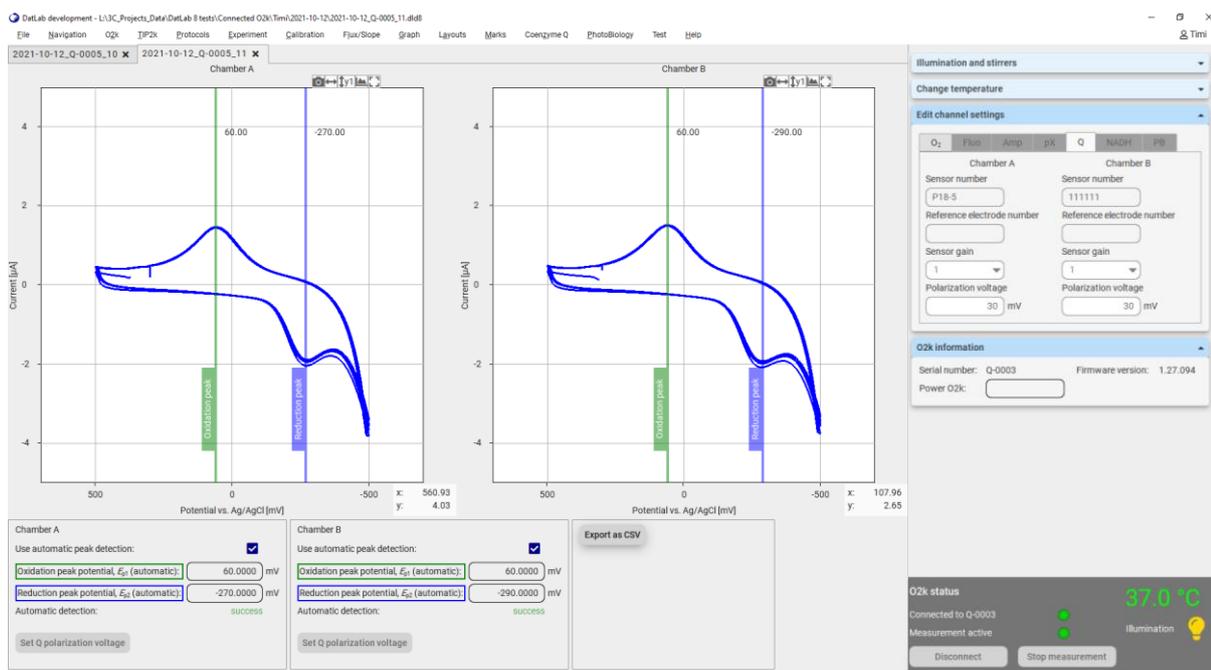
2.2. Automatic and manual peak detection

The software can automatically detect the oxidation and reduction peak potentials for both chambers if Use automatic peak detection is selected. Please check for plausibility. By unticking Use automatic peak detection, it is possible to select the peak manually by dragging the blue line to set the reduction peak potential in the lower part of the traces and the green line to set the oxidation peak potential in the upper part of the traces.
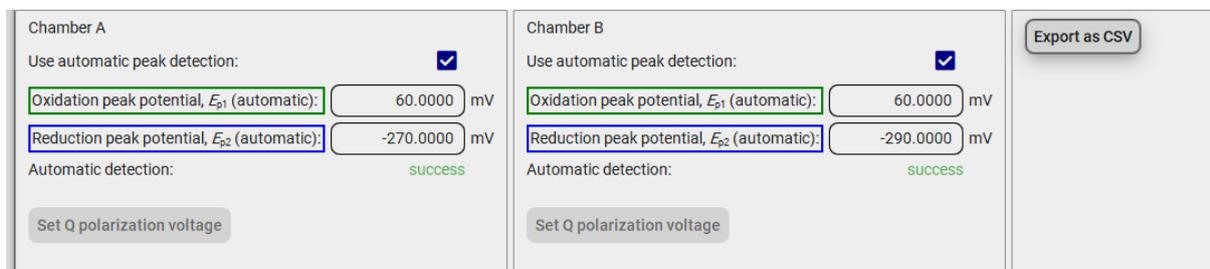
2.3. Set Q polarization voltage

If the automatic peak detection in the presence of coenzyme Q was successful, a pop-up window automatically appears asking whether the value obtained for the oxidation peak potential of coenzyme Q should be used for polarization voltage in chamber A or B, or both.
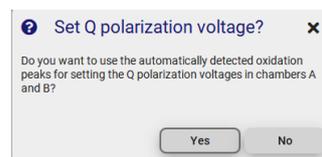

By clicking on Yes in the "Set Q polarization voltage?" window, the value obtained for the oxidation peak potential can be set to measure the raw Q signal at any time separately for chamber A and B.

2.4. Saving and exporting data

Files are automatically saved in a .dld8 file format. Before starting the measurement, the software automatically asks for the directory in which the file can be saved.


When disconnected from the O2k, to save the file under a different file name, optionally in a different directory, by clicking on File then Save as… in the upper menu.
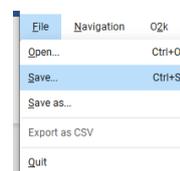
After the experiment, there is the option to export plots and events to a text file for further use in Excel and other programs by clicking on Export as CSV (.csv file format).

The figures can be saved separately as .png files by clicking on the 📷 camera icon in the upper right corner of each plot.
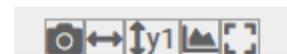

2.5. Scaling

The respective icons for scaling can be found in the upper right corner of each plot.

    ↔   change the scaling of the x-axis.

    ⬍y1   change the scaling of the y1-axis.

    ⛰   zoom in on data range.

    ⛶   reset original data view.

2.6. *Opening a file*

Previously recorded .dld8 files can be opened by clicking File then Open… in the upper menu. It is possible to open more than one file at the same time.
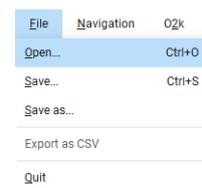
3.   Author contributions

Komlodi T and Gnaiger E were responsible for the project and instrumental development. Haider M and Niedenzu W developed the software. Komlodi T and Cardoso LHD performed experiments and tested the software. Komlodi T, Cardoso LHD and Tindle-Solomon L prepared the MiPNet.

4.   Acknowledgements

J Iglesias-Gonzalez as a former member of the team contributed to this MiPNet.