FuelCell Addendum – CorrWare® Experiment

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Introduction

This addendum describes the CorrWare experiment implementation in FuelCell Versions 3.9c and later.

The CorrWare experiment allows a test using CorrWare and a Potentiostat/Galvanostat to be included in a series of FuelCell experiments. For example, the CorrWare experiment can be used to perform a cyclic voltammetry (CV) experiment or fuel crossover experiment where it is necessary to polarize the cell above the open circuit potential.

The FuelCell software should be installed and the system tested without CorrWare prior to enabling these controls.

CorrWare should be installed and tested with the Potentiostat/Galvanostat prior to enabling these controls. A predefined experiment list must be created and saved directly from CorrWare before it can be used by the CorrWare experiment in FuelCell.

Hardware Support

890C/890CL/890e/850 unit is required. The 890 and 890B are not supported.

The 'Anode Burp Valve' digital output signal is used to activate the relay to disconnect the negative 890 Load Terminal (-).

Contact Scribner Associates for further instructions on access to this signal line in the Load Unit.

Enabling CorrWare Support

CorrWare Experiment support is enabled by manually editing the fuelcell.ini file on the computer.

- Open the "fuelcell.ini" located in the C:\FuelCell\ directory file using Notepad.

- Add the EnableCorrWare=1 line to the end of the [System] section of the ini file as shown below. Note that other settings in the [System] section may differ from those shown below.

[System]
EnableAnodeGas=1
EnableAnodePurge=1

EnableAnodeTemp=1
EnableCathodeGas=1
EnableCathodePurge=1
EnableCathodeTemp=1
EnableCellTemp=1
EnableCorrWare=1


- Add the [CorrWare] section as shown below.

 [CorrWare]
Instrument=1
Relay=1

Two options are available:

1. Multiple Instruments can be defined in CorrWare using   File | New Instrument. Instrument=1 indicates that CorrWare Instrument #1 should be used. The default value is 1, so this parameter is only necessary if instrument 2 or higher is used.

2. A relay signal can be used to disconnect the 850/890 Load (-) Terminal. Disconnecting the 850/890 load terminal may reduce current leakage between the 850/890 and the Potentiostat. If Relay=1, the relay signal is used. If Relay=0, the relay signal is not used. The default values is 1, so this parameter is only necessary if Relay=0 is desired.

CorrWare Experiment Setup Screen

The new experiment type is available in the Select Experiment screen.
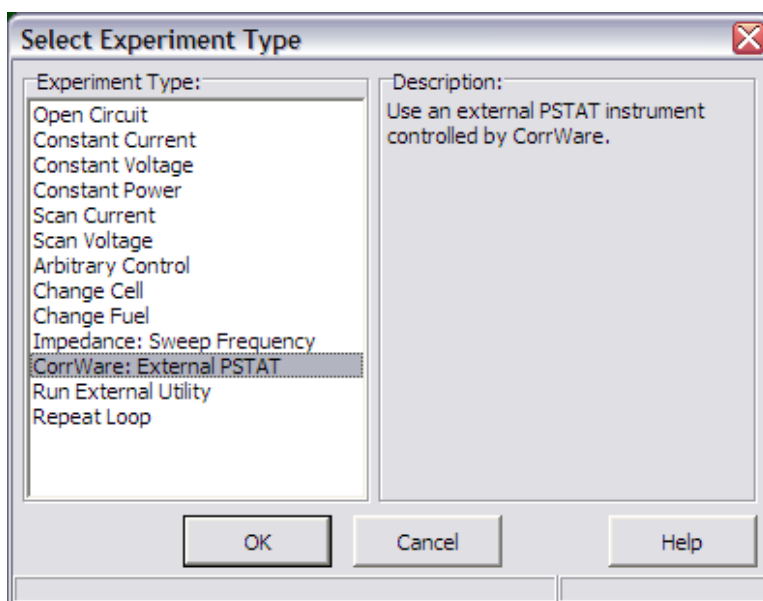
The setup parameters for the CorrWare experiment are shown below:
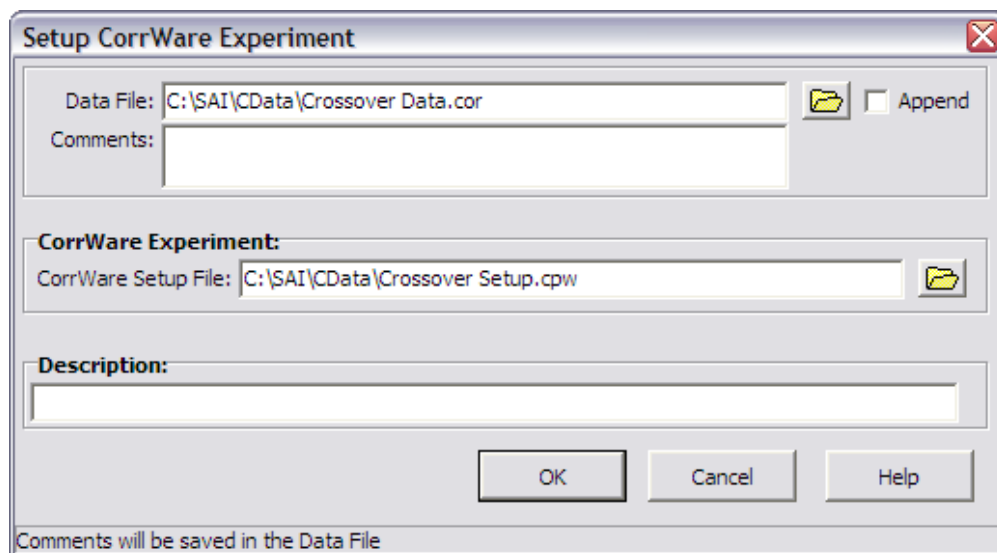
The Data File parameter is used to select the Data File name for the experiments in the CorrWare experiment list.

If the Data File parameter is blank, CorrWare will used the existing data file names specified the CorrWare setup file.

If the CorrWare setup file contains multiple experiment lines, the Data File name is appended with a number to produce distinct file names. For example, if there are 3 lines in the CorrWare setup file, the file names would be:

Crossover Data1.cor
Crossover Data2.cor
Crossover Data3.cor

If Append is checked, the same data file is used for each line in CorrWare setup file, and the Append parameter is set for each line.

The Setup file must specify a valid CorrWare setup file.

Running the CorrWare experiment

The CorrWare experiment can be inserted at any point in an experiment list. Depending on the type of tests that will be performed from CorrWare, it may be necessary to put other steps surrounding the CorrWare step in order to apply appropriate gases to the cell before and after the CorrWare step is performed. For example a typical schedule may be:

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Setup Fuel [use reformate channels to apply H2 to Anode, N2 to Cathode]
Open Circuit [apply open circuit while the O2 is purged from the cell]
CorrWare [run a voltage sweep to measure H2 crossover]
Setup Fuel [apply H2 to Anode, O2 or Air to Cathode]
Open Circuit [allow O2 or Air to fill the cell until correct OCP is measured]
Constant Current [resume normal fuel cell testing under load]
…

Just before the CorrWare step, the following sequence is performed.

- The Load is turned Off. The Load button on the main screen of FuelCell will change to 'Apply Load'
- Delay 500 ms
- Activate Load disconnect relay (mechanically disconnects 850/890 Load (-) terminal)
- Delay 500 ms
- Start CorrWare experiment

During the CorrWare step, the 'Apply Load' is disabled. It cannot be turned on until the CorrWare experiment finishes.

Just after the CorrWare step, the above sequence is reversed:

- CorrWare finishes
- Delay 500 ms
- Deactivate lLoad disconnect relay (mechanically reconnects 850/890 Load (-) terminal)
- Delay 500 ms
- The Load is turned On. The Load button on the main screen of FuelCell will turn to 'Stop Load'
- Continue with the next step in the experiment list.