

## MR-9101RDE-2 Chemical Test Procedure

The purpose of this test is to perform a final examination of the RDE-2 rotating disk electrode before it is shipped to customer, and to provide the customer with the procedure and typical data output. From these data, the customer can verify that the instrument is working properly on arrival and can gain some experience with its operation. The BAS 100B/W Electrochemical Workstation is used in this test.

### Test Solution

2 mM potassium ferricyanide with 1 M potassium nitrate (approx. 15 mL required).

#### Preparation of Potassium Ferricyanide Test Solution (2 mM in 1 M KNO<sub>3</sub>)

- a. Weigh 33 mg (0.033 g) of K<sub>3</sub>Fe(CN)<sub>6</sub> and put it in the 100 mL beaker.
- b. Weigh 5.0 g KNO<sub>3</sub> and put it in the same 100 mL beaker.
- c. Add 50 mL of water to the beaker and stir to dissolve it.
- d. If using a glassy carbon electrode, then adjust solution pH to 2-3.

### PROCEDURE

1. Connect the power cord, the analog cable (EW-7524), control cable (EW-7526) and the Purge and Rotate Remote cable (EW-7547) between the RDE-2 and the BAS 100B/W. For the Purge and Rotate Remote cable, connect only the ground and purge wires to the screw terminal on the back of the RDE-2.
2. Apply power to the RDE-2 and make sure the POWER LED is on. Raise the electrode/rotator assembly to its highest position by using the height adjustment knob. Tighten the knob to secure this position.
3. Toggle the **REMOTE/SET/LOCAL** switch to the **REMOTE** position.
4. Pour approximately 15 mL of the potassium ferricyanide test solution prepared as described below into a cell vial (MR-1208).
5. Pivot the cell base to the right as far as it goes and bring the cell vial with the test solution from underneath onto the bottom of the cell top. Pivot the cell base back to its original place and secure the cell vial by lowering the cell top holder onto the cell vial by loosening the height adjustment knob. Tighten the height adjustment knob.
6. Remove the glassy carbon rotating disk electrode by unscrewing it from the shaft. Put in a safe place. Polish and screw a platinum RDE electrode (MF-2067) on the rotator shaft. Make sure the electrode has been rinsed thoroughly before putting it on the unit. Although a platinum electrode is preferred, a glassy carbon electrode can also be used if a platinum electrode is not available.
7. Put the reference electrode and the platinum wire auxiliary electrode in the holes on the cell top and connect the cell lead to the appropriate electrodes (the red wire to the auxiliary and the white wire to the reference).
8. Lower the electrode/rotator assembly onto the cell top by loosening the height adjustment knob.

- Open the BAS 100W software. Select **SMDE** as the **Cell Stand** in the **Setup** window under the **File** menu.
- Open **Select Mode** dialog box from the **Method** menu and select **Hydrodynamic Techniques – RDE**.
- Change the **General Parameters** to those shown below and click **OK**.

**RDE General Parameters**

Initial E : 500 mV

Final E : -100 mV

Scan Rate : 20 mV/s

Rotation Rate : 400 rpm

Sensitivity : 10 uA/u

Cancel OK Specific >>

- Select **Start Run** from the **Control** menu to start the experiment. The rotation rate on the digital display of the RDE should be  $400 \pm 3$  RPM. If it is different, contact BAS Service.
- The experimental data will be displayed automatically at the end of the experiment, and should show the sigmoidal shape characteristic of steady state behavior. Print the data. An example output is below.

