

VMP3 MULTI-CHANNELS POTENTIOSTAT/GALVANOSTAT/EIS

Standard Operating Procedure

Lab: [155 Engineering Sciences Building]

Department: Materials Science and Engineering

PI: Paul V. Braun

Written By: Sanghyeon Kim

Section 1: Overview

Type of SOP: Process Hazardous Material Hazardous Class of Materials Equipment

Synopsis:

This SOP describes the correct way of using the VMP3 multi-channels potentiostat/galvanostat/EIS instrument for doing electrodeposition, battery charge/discharge cycling, and impedance spectroscopy.

Section 2: Risk Assessment Summary (Hazards and control measures)

Materials:

Material (name, CAS #, other ID)	Hazards
Numerous kinds of liquid electrolytes which are generally either aqueous or non-aqueous	Corrosive, target organ toxicity, acute toxicity, health hazard

Relevant References for Material Hazards:

Most can be found on Aldrich.com or the websites of the electrolyte vendors

Equipment Hazards:

VMP3
Insulated electric cables
Desktop computer
Jars containing acidic/basic electrolytes

Hazardous Conditions:

Electrical Shock
Improper use of this equipment can lead to physical damage to the human body. In particular, electrical shock may occur if one touches exposed wires that carry current.

Bodily Injury

Improperly fabricated samples may leak electrolyte materials, which are skin and eye irritants

Technique Hazards:

Plugging the power cables of the VMP3 and desktop computer

Connecting the electric cables of the VMP3 channels with electrochemical cells

Personal Protective Equipment

Safety eyewear

Nitrile gloves

Lab coat

Closed toed shoes

Long pants

Engineering Controls

The VMP3 is controlled using the EC-Lab® software on the desktop computer located adjacent to it. Users must be familiar with the software before setting up and running electrochemical experiment. In particular, users must know how to properly specify safety limits on the voltage, current, and power.

Section 3: Procedures

General Testing Procedure

1. Reserve open channels that will be vacant for the duration of the experiment you will run by using Braun group google calendar.
2. Connect your electrochemical cell using the wire leads having either alligator clips or customized connectors at one end of the leads.
3. In the EC-Lab® software, left-click the channel number you reserved.
4. Select the desired technique (potentiostatic, galvanostatic, cyclic voltammetry, impedance, or mixed) in the EC-Lab® software. Double check the safety limits for voltage, current and, power. (See VMP3 manual for instructions on programming a schedule.)
5. Press ► to start the experiment.
6. When the experiment is finished, remove your cell dispose of/store it properly.

Note: Before programming a schedule and starting an experiment, VMP3 users MUST get specific training from the current Braun group trainer.

Section 4: Waste Disposal/Cleanup

All specimens tested on the VMP3 are subject to the appropriate chemical waste disposal requirements set forth by the Division of Research Safety (DRS).

Section 5: Emergency Response

Review the location of nearest safety shower before starting the procedure.

In case of a fire, identify two routes to exit the room.

Contact Sanghyeon Kim for program error.

Section 6: Additional Information

Advice:

For glove selection for a particular hazard, please refer to the specific glove manufacturer's selection chart in Appendix 3 of the DRS Chemical Safety Guide (rev. July 16, 20104)

Checklist:

- Read VMP3 manual
- Check open circuit voltage before start
- Another senior researcher is nearby when first use
- Proper fire extinguisher is nearby

References:

