DVS Advantage (Surface Measurement System)

THIS INSTRUMENT RREQUIRES TRAINING BY INSTRUCTOR

CONTACT TO : shuichi@chalmers.se

SOP ver.1 (2022.01.24)

DVS has following risks!

- **Damage to machine: DVS has precise micro balance. Don't vibrate machine!**

Figure 2.1: The Dynamic Vapour Sorption (DVS) Advantage system

Starting up the DVS

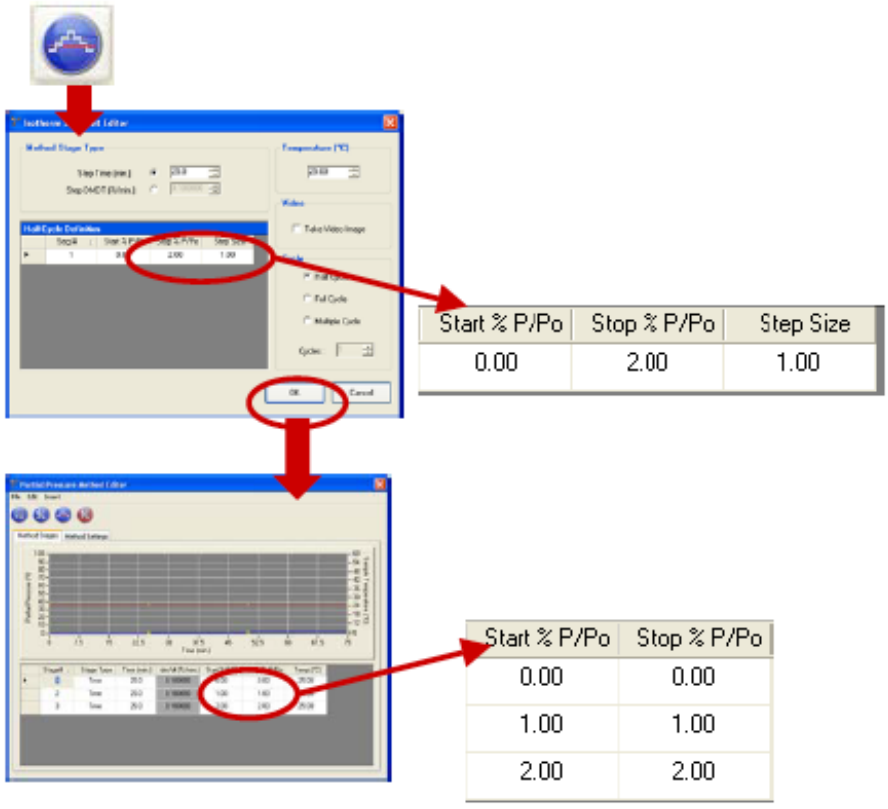
1. **Check the solvent levels in the flasks, should be 50-70%.** (Left: water, Right: empty) If any other solvent is preferred – contact the responsible person
2. Turn on Microbalance (back side)
3. Turn on DVS control Unit (back side)
4. Turn on Computer
5. Turn on Oven (front panel)
6. **Turn on Carrier gas supply (dry N2, 1-2 bar)**
7. Open DVS Advantage software
8. Wait until Optical Sensor Status become Measuring (5-10 min) (Instrument Data tab)

Calibration Balance

1. When Microbalance is turned off, Microbalance calibration is recommended
2. From Calibration tab, select Calibrate Balance
3. Load empty sample pan
4. Wait for balance stabilize and click OK
5. Carefully place 100mg standard weight in the sample pan
6. Wait for balance stabilize and click OK

Create a method

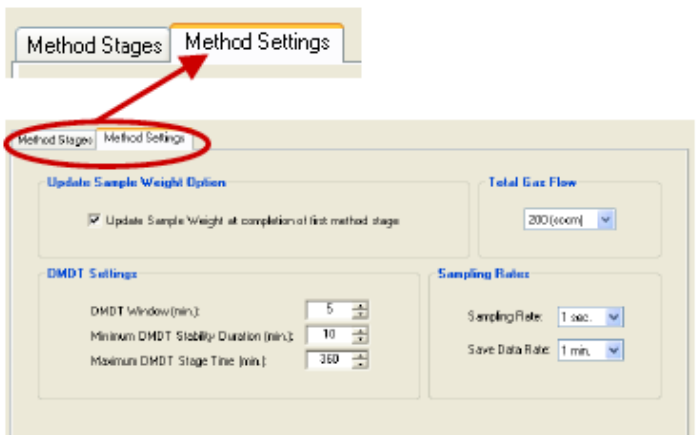
1. Choose **Method/Partial Pressure/New Method or Edit Method**
2. **New Method**: start the building of the method by filling in the **Isotherm Segment Editor**.
3. The method is visualized under **Method Stages**.



Start % P/Po	Stop % P/Po	Step Size
0.00	2.00	1.00

Start % P/Po	Stop % P/Po
0.00	0.00
1.00	1.00
2.00	2.00

4. In the Method settings, Total Gas Flow, Sampling Rates and DMDT setting can be changed.

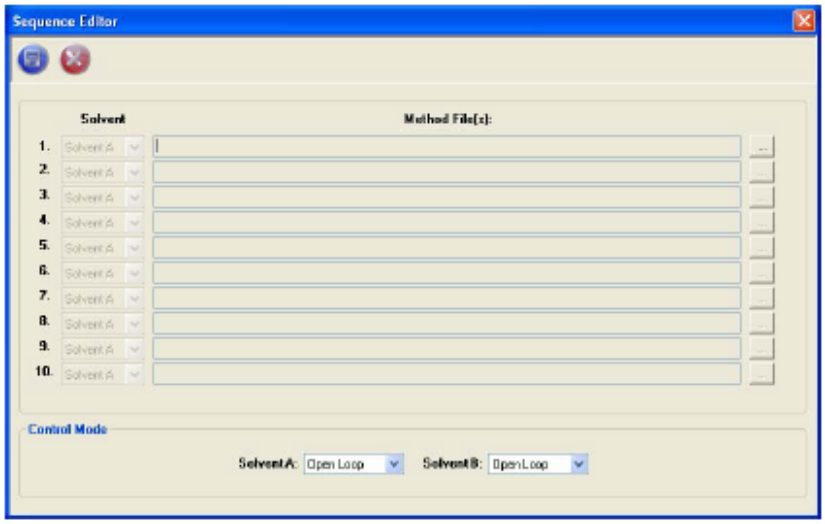


- **Default values for water :**
    i. Total gas flow: 200 sccm
    ii. Sampling rate: 1 sec
    iii. Save data rate: 1 min
    iv. DMDT Window: 5 min
    v. Min DMDT stab: 10 min
    vi. Max DMDT stage: 1440 min

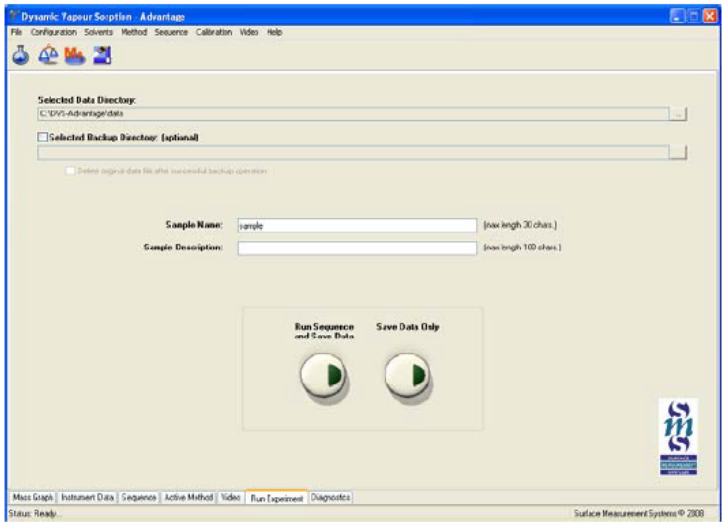
5. **Save method**

Set up a sequence and save data

1. Choose **Sequence/load or New**
2. **Load**: Browse of a saved sequence from a folder
3. **New**: Create a new sequence by first browsing for your method. Then save the method combination as a sequence.

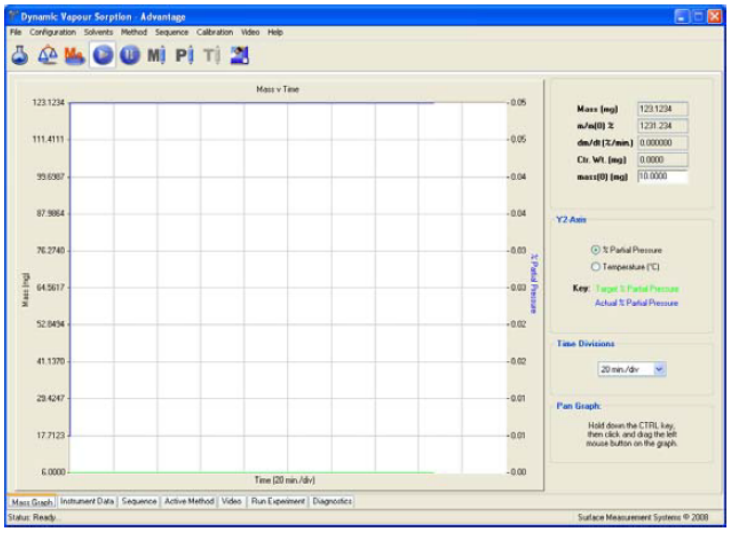


4. Move to **Run Experiment window** and fill in all information about the sample and where to save the data.



Load the sample and start the run

1. Move to Mass Graph and reset the scale by using ().
2. When stabilized (5-10 min), tare the sample holder ().
3. Unload the holder and mount a suitable amount of sample (2-5 mg, depend on the expected weight gain).
4. Load sample holder with sample, let equilibrate for a short time (about 2 min), then set the initial mass (). This is important when using the step DMDT.



5. Move to **Run Experiment window** and start the run by clicking on ().

After the run

1. Unload the sample and clean the sample holder
2. Load holder to balance

Closing Down the DVS instrument

The DVS Advantage Control Unit and the Cahn microbalance Controller are best left powered up at all times. The only need for powering down these units may arise during extended laboratory closures where local laboratory safety policy requires all instruments to be turned off.

In these cases, follow the procedure below:

1. Exit the DVS Advantage software.
2. Turn off the carrier gas supply.
3. Turn off in the following order:
    a. The PC compatible computer.
    b. The DVS Control Unit main power via the switch on the back of the unit.
    c. The Cahn microbalance controller via its rear switch.
    d. The Oven via the front panel switch

Salt Calibration (Optional)

1. **Note:** It is recommended that Salt Validation Calibrations are carried out at least every six months.
2. Check DVS Advantage Operation Manual: **12 Appendix B – Salt Validation Calibration**.

NOTIFY THE INSTRUMENT RESPONSIBLE OF ANY ERRORS OR MISFUNCTIONING