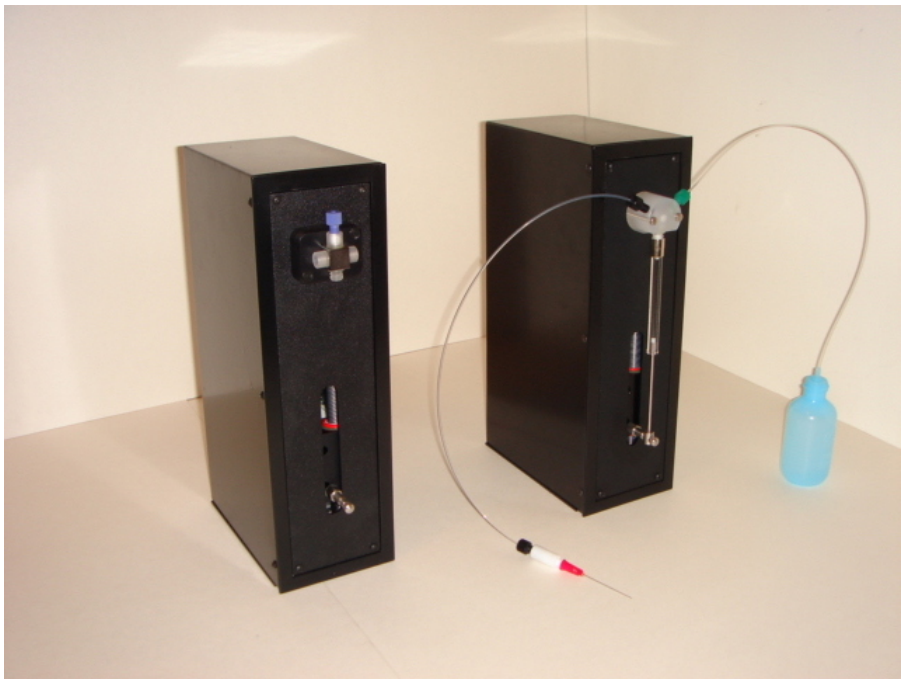
Sindatek 欣創達科技有限公司

241 台北縣三重市三和路三段 109 號 3F 之 7 www.sindatek.com E-mail: info@sindatek.com
Tel: (02) 2898-1231 Fax: (02) 2898-1241

Auto Dispensing Unit (ADU)



PC-controlled, supporting high-precision glass syringe like Hamilton from 5µl to 50 ml, stepped motor with optical encoder for positioning feedback, dosing rate range at 1 ~ 400 µl/min. Up to 4 units can be supported by the software, they are connected to dispensing needles located in the syringe selector via fittings and tubing and allow undisturbed, nearly pulse-less increasing or decreasing of droplet volume for measurements of advancing/receding contact angle and interfacial rheology properties.

These fully programmable, precision liquid handling instrument are available in single and multi-channel configurations. Due to its very short connection path (60 mm), the dead volume can be kept very low. Its wide dosing rates make it the best choice for scientific and industrial routine measurements.

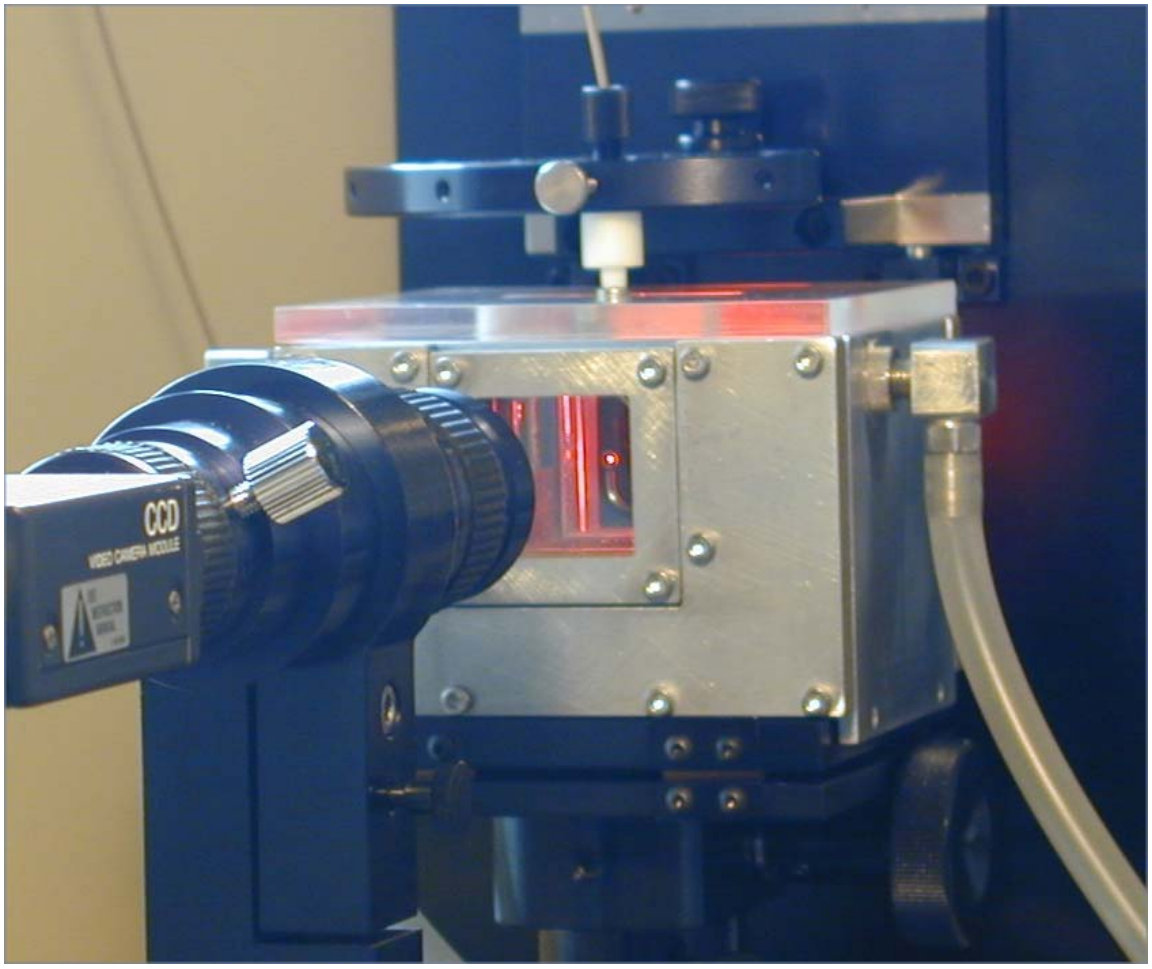
Versatile dispensing mode settings with manually, continuously, fixed volume, volume scope, volume cycle and volume oscillation are available for specific applications.

Temperature Chamber

A tempering chamber suitable for liquid / vapor, liquid / liquid, liquid / solid / vapor and liquid / liquid / solid measurements under controlled conditions. Temperature is stabilized by a user-provided circulating bath through a unique one-loop thermal transfer construction in the aluminum chamber body, which allows desired temperatures can be reached and stabilized exceptionally fast. The temperature range is from about 5 ℃ to about 80 ℃ if a suitable circulating bath and fluid are used. Due to its double-glass window construction, problems with window condensation can be effectively avoided, which ensures a clear, crisp imaging quality for measurements.
The chamber can be easily disassembled for cleaning purpose, suitable temperature

241 台北縣三重市三和路三段 109 號 3F 之 7 www.sindatek.com E-mail: info@sindatek.com
Tel: (02) 2898-1231 Fax: (02) 2898-1241

measurement device with RS-232-interface and software support will also be available as options (0.1 ℃ resolution).



Dimensions:

Chamber: 110 x 70 x 95 mm (W x H x D)
Glass View Windows : 30 x 30 mm
Top Opening: 40 x 10 mm (W x D)
Internal Measuring Space: 45 x 30 x 38 mm (W x D x H), which corresponds to an internal volume of about 50 ml.

Dimensions can be customized within a certain range based on the desired applications.
For large samples or for more measurements on one sample, the (internal) width of chamber can be extended, for example, for another 20-30 mm.

Electrically heated chambers can be also provided for high temperature ranges (above room temperature up to ca. 300 ℃), An electrically heated chamber is required for measuring polymer and hot melts.

Sindatek 欣創達科技有限公司

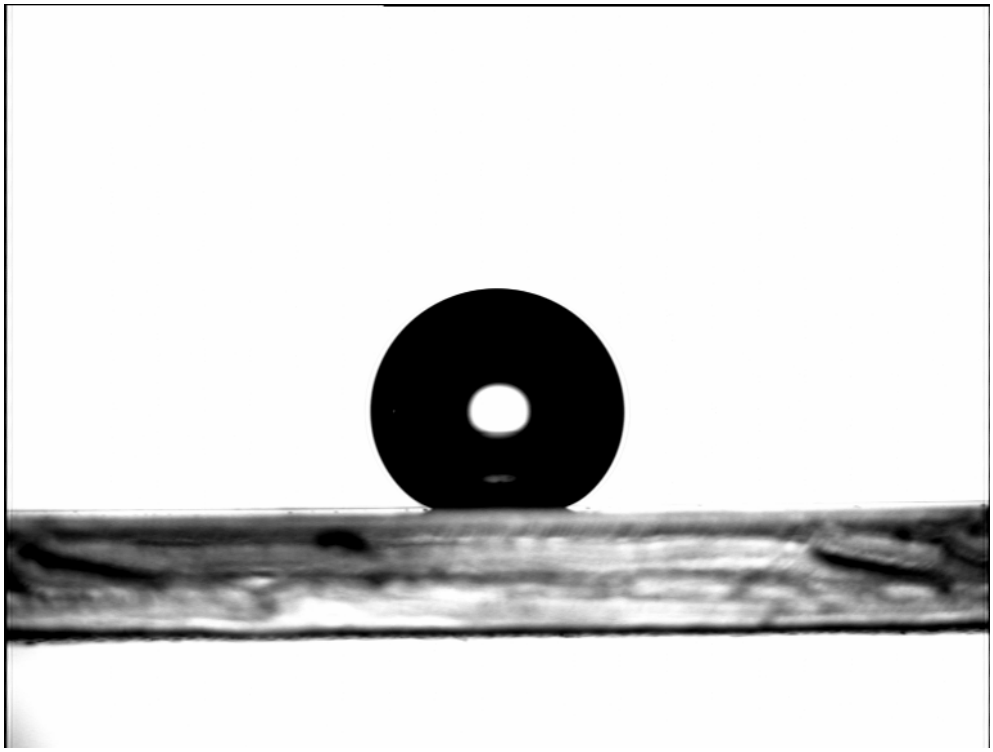
241 台北縣三重市三和路三段 109 號 3F 之 7 www.sindatek.com E-mail: info@sindatek.com
Tel: (02) 2898-1231 Fax: (02) 2898-1241

Surface/ Interfacial Tension Applications:

Temperature is an important factor in-case-of surface/interfacial tension measurements, and all tests should be done in a well-controllable environment, if surfactants are involved, dynamic behaviors is to be expected (i.e. surface/interfacial tension could be strongly dependent of surface-aging). In those cases it may take a long time (minutes to hours) before the final equilibrium or a steady-state can be established, a pendant drop can disappear due to evaporation during this time, or it's volume decreases strongly, which will affect the real surface composition and thus the resulting surface tension. It is meaningful to use the Raising Bubble/Drop method instead of Pendant Drop method for those situations, that is to build a gas bubble in a bulk solution (liquid) phase, which raises from bottom to top. All the necessary accessories will be available upon request.

CMC Applications:

The most classic setup is to prepare a series solutions of different concentration, and then determine their surface tension individually.
Another setup is to use the raising bubble method: fill the chamber with a known volume of solvent (e.g. water) at the beginning, determine its surface tension. And then add a certain mount of surfactant solution of known conc. into the solvent (for example using our Auto Dosing Unit), waiting for mass transferring equilibrium, and determine the surface tension again; and so on. It could be a more effective arrangement for routine CMC measurements with double syringe system.

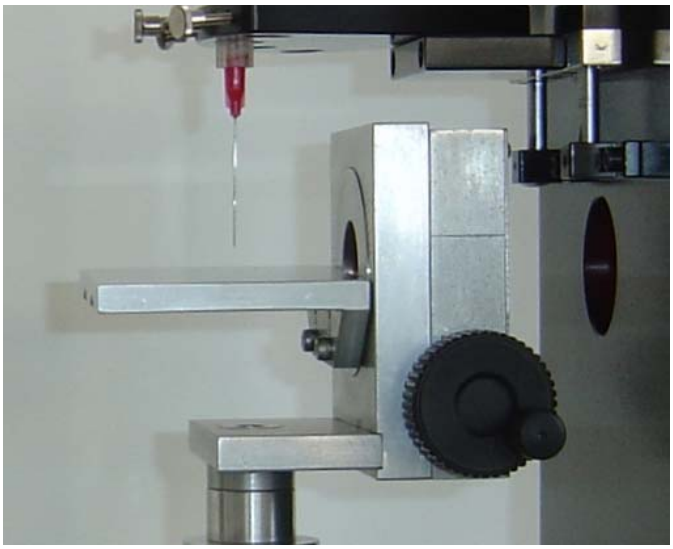


A captive bubble taken in the tempered chamber (image flipped vertically)

Sindatek 欣創達科技有限公司

241 台北縣三重市三和路三段 109 號 3F 之 7 www.sindatek.com E-mail: info@sindatek.com
Tel: (02) 2898-1231 Fax: (02) 2898-1241

Using of a Tilting Stage in Contact Angle Measuments



The unique sample Tilting/Rotation Stage concept allows determination of advancing and receding contact angle simultaneously as well as the roll- off angle, and all of them in a very compact way: either manual or motorized. Tilting range: 0 ~ 90 degrees.

Determination of Contact Angle Hysteresis and Characterization of Hydrophobic Properties of a Solid Surface

The tilting stage method is to slowly tilt a contact angle sample until the sessile drop on it *begins* to move in the downhill direction. At that time of "*incipient motion"*, the downhill contact angle is the advancing angle and the uphill angle the receding contact angle. (Strictly speaking, only droplet images immediately before actual motion takes place should be used for determination, because once motion starts, the system is no longer in thermodynamic equilibrium).

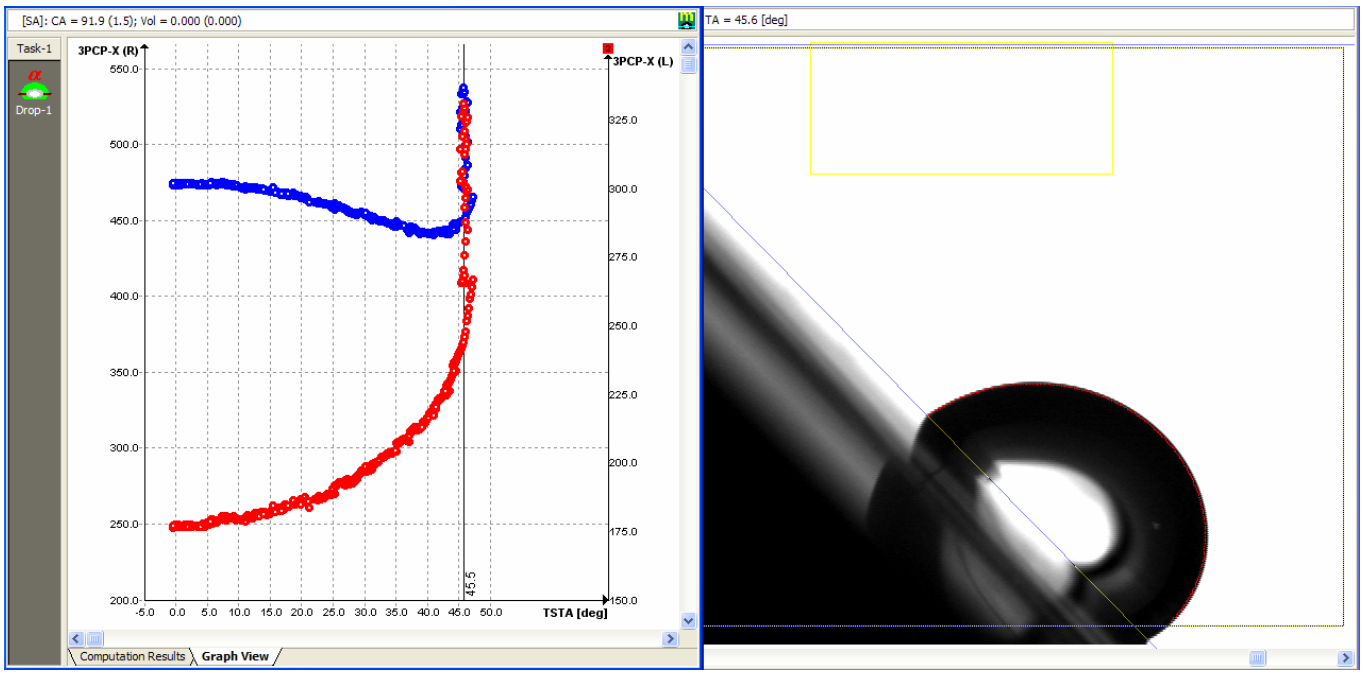
The principal alternative to the tilting stage method is having the dispense needle remain embedded in the sessile drop and pumping in until the drop expands in base area and pumping out until the drop contracts in base area. The tilting stage method has two comparative advantages:

1) there is no problem of the dispense needle distorting the drop shape, and
2) both the advancing and receding angles are obtained at the same time, and from the very same droplet and on the very same surface location

Furthermore, two of the most important parameters which can be used for characterizing the (super-) hydrophobic or water repellent properties of a sample surface, contact angle hysteresis and the droplet moving force (related to the droplet volume and roll-off angle), can be determined straightforward by using a tilting stage.

Sindatek 欣創達科技有限公司

241 台北縣三重市三和路三段 109 號 3F 之 7 www.sindatek.com E-mail: info@sindatek.com
Tel: (02) 2898-1231 Fax: (02) 2898-1241



Moving of Uphill (red dots) and Downhill (blue dots) Contact Points as a Function of Tilting Angle: it can be seen straightforward that the droplet begins to roll-off at a titling angle of 45.5 degrees.

Motorized Z-Axis-Stage

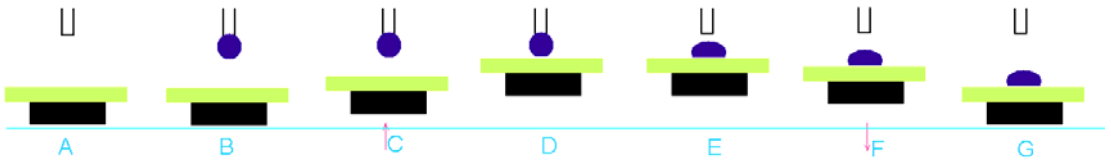
A example procedure for a typical measurement by using an ADU and a motorized z-axis. Most important features will be activated during our measurements in a reproducible and controlled way: drop volume, way of drop deposition onto the sample surface, time after contact to start calculation, etc.

==========

Example Procedure Descriptions:

A: Start Positions.
B: A drop of given volume is formed (e.g. using ADU)
C: The sample table is then moving up ...
D: To the specified position (can be set previously or controlled automatically by the software).
E: As soon as the liquid drop touches sample surface, the TIMER is reset to ZERO and video recording may be invoked here automatically if required.
F: Sample table is returned to the Starting Position.
G: Measurement will be invoked at a specified time for a given number of computation. Average values and statistical errors will be built based on these calculation reults.

241 台北縣三重市三和路三段 109 號 3F 之 7 www.sindatek.com E-mail: info@sindatek.com
Tel: (02) 2898-1231 Fax: (02) 2898-1241



==========

With the help of a motorized z-axis, many of new features can be introduced like in case of ADU: automatic RESET of TIMER, automatic deposition of drop, automatic start of calculation at a given time after first contact, automatic invoke of video recording after contact, etc.