Kino

A80

Excellent Weight-based Interfacial Chemistry Analytical System

– Full Automatic Surface & Interfacial Tensiometer & Contact Angle Meter

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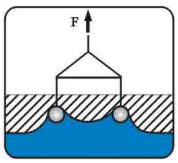
A80 series, focusing on meeting demands of high–quality and high–precision in research and measurement of interface chemical analysis. It's designed for measurement of surface tension (ST) / interface tension (IFT) , analysis of equilibrium and dynamic contact angle (CA / DCA) of solid material, contact angle of powder and fiber, as well as measurement of critical micelle concentration (CMC) of surfactant, Langmuir–Blodgett film and more, which are all characterizations of interface chemistry.

It's advanced among equipments with the highest update speed (92 data/s) micro–analytical balance (0.01mg), precision vertical travel positioning stage controlled by stepping motor and digital temperature semiconductor sensor. The instrument advantages in such merits as simple operation, high precision and accuracy, higher data update speed, more sensitive reaction, more accurate positioning with resolution of 0.007μm and excellent quality.

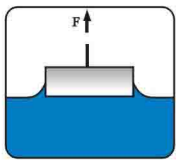
A80 is equipped with CAST® 1.0 which represents world leading weight based interface chemistry analytical system. SM01, its main software module, adopts 4 kinds of different surface / interface tension measurement methods (3rd generation Young–Laplace equation correction based Wilhelmy plate method, DuNoüy ring method and classical Wilhelmy plate method) as well as powerful data management. It can be used for measurement of middle to high viscosity materials (–10000CP), equilibrium and dynamic surface / interface tension, surface tension of surfactant and its CMC. In addition, with software module SM02 – contact angle analytical system, it can also be used for measurement of Wilhelmy plate method based dynamic / static contact angle, contact angle of single fiber or fiber bundle, as well as modified, extended and wicking Washburn method based contact angle of powder, surface free energy of solid and its contributions (dispersive force, polar force, hydrogen bond value), density, sedimentation and penetration speed, tensile force of single fiber, size–distribution analytical by sedimentation, Langmuir–Blodgett film, analytical balance, thermal analytical balance, water absorption and more.

Our international design, global sourcing and professional service provide you comprehensive, efficiency and professional solution in interface chemistry measurement, which represent the leading level of weight–based interface chemistry equipment.

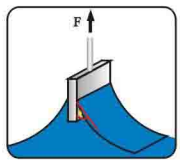
Measuring Method



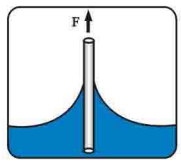
DuNoüy Ring Method



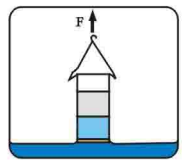
Wilhelmy Plate Method



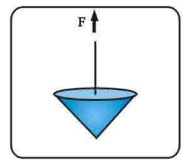
Dynamic Wilhelmy Method



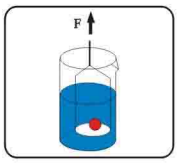
Single Fiber Wilhelmy Method



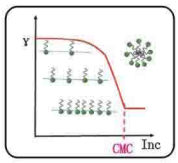
Washburn Method



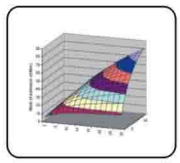
Sedimentation &
Penetration Measurement

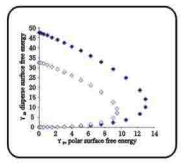


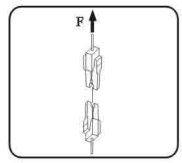
Density of Liquid
or Solid Determination



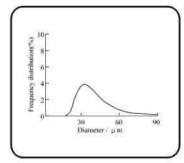
CMC Determination


Surface Free Energy


Wetting Behavior Analysis
Wetting Envelopes



Tensile Force
of Single Fiber


Size–Distribution Analysis
by Sedimentation Velocity

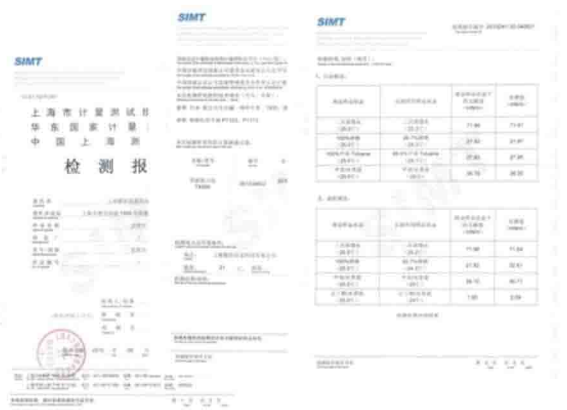
Applications

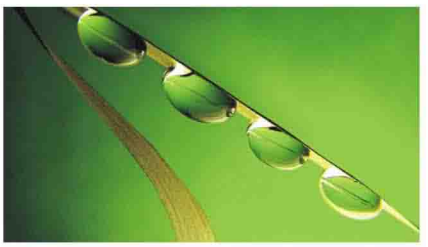
	Product Name	Applications
1	Ink, Paint, Pigment, Auxiliarie and More	Analyzing wettability, polar force and dispersive force in printing / coating , R&D and product's quality control
2	Printing	Development of printing plate detergent and its wettability analysis, wettability & printing analysis of film, paper, etc.
3	Film	Wettability analysis, quality control and coating capacity analysis
4	Cosmetic, Personal Care Product	Analysis of dispersity, stability and wettability of emulsion and suspending agent
5	Surface Treatments, Electronic Coating	Wettability analysis, quality control
6	Pesticide	Development, formula preparation and wettability analysis of additive
7	Nano–fiber and Powder	Analyzing hydrophilic or super–hydrophobic contact angle and dynamic contact angle
8	Petroleum	Indicating interface tension in secondary and tertiary oil recovery, quality control of displacement agent , degradable ingredients analysis
9	Textile	Analysis of contact angle, wettability, surface tension and adhesive force
10	Pharmaceutical, Cocatalyst Fluid	Analysis of wetting behavior , formation & expansibility, surface tension, wettability for medical pill and pharmaceutical active agent
11	Power	Surface tension analysis of transformer oil and insulating oil, and contact angle analysis of fiber bundle
12	Surfactant	Measurement of surface tension, CMC, adsorption and competition of surfactant, protein and polymer on surface, characterization of interface rheology properties, as well as study of efficiency of surfactant via CMC measurement
13	Cleaning Product, Detergent	Adsorption rate, properties, appropriate concentration of surfactant
14	Adhesive, Resin	Analysis of surface tension, adhesive work for viscosity sample
15	Food and Feed	Analysis of surface tension, cleanness of can coating
16	Polymer	Characterization, surface optimization and modification of polymer
17	Emulsion and Foam	Stability analysis and estimation of surface tension reduction
18	Cleanness Analysis of Sophisticated Mechanics	Surface cleanness analysis based on change of surface tension
19	Lubricant, Engine Oil, Fuel Oil	Aging monitoring of oil, analysis of degradation product content in oil
20	Waste Water Treatment and Filtering	Estimation of penetration speed and reducing efficiency of surface tension
21	Fiber Bundles, Fiber and Single Fiber	Wettability analysis
22	Sedimentation and Penetration Speed, Nanoparticle	Study of sedimentation and ductility of dispersion

$$\sigma\cdot\left\{\frac{1}{R_1}+\frac{1}{R_2}\right\}=\sigma\cdot\left\{\frac{\sin\phi}{X}+\frac{1}{R_1}\right\}$$

Standards

The instrument has passed authentication by relevant authorities, strictly implementing relevant measurement standards. We are now pioneer enterprise in drafting integrated instrument measurement standards for interface chemistry analytical meters.





USA KINO's instruments confirm with the following standards

ASTM D 0971–91: Standard test method for interface tension of oil against water by the ring method

ASTM D 1331–56: Standard test method for surface and interfacial tension of solutions of surface active agents

ASTM D 1417–83: Standard method of testing rubber lattices–synthetic

ASTM D 1590–60: Standard test method for surface tension of water

BS EN 14370–2004: Surface active agents – Determination of surface tension

ISO 1409–1995: Plastics/rubber–Polymer dispersions and rubber lattices (natural and synthetic)–Determination of surface tension by the ring method

ISO 6295: Determination of interfacial tension of oil against water

ISO 304 & ISO 6889: Surface active agents–Determination of interfacial tension by drawing up liquid films

ISO 4311: Anionic and non–ionic surface active agents–Determination of the critical micellization concentration–Method by measuring surface tension with a plate, stirrup or ring

$$\sigma \cdot \left\{\frac{1}{R_1}+\frac{1}{R_2}\right\}=\sigma \cdot \left\{\frac{\sin\phi}{X}+\frac{1}{R_1}\right\}$$

$$\sigma_{SV}=\sigma_{SL}+\sigma_{LV}\cdot\cos\theta$$

$$\sigma_{SV}=\sigma_{SL}+\sigma_{LV}\cdot\cos\theta$$

Performance Features

Advanced highest speed micro-weighing sensor with more sensitive reaction, more detailed information and more accurate measurement values

- High-speed micro-analytical balance with weighing readability of 0.01mg
- More powerful functions such as temperature drifting correction, zero tracking and built-in weight self-calibration, etc.
- 92 data/s of data update speed, more detailed, more reliable, especial for high-demanding measurement of single fiber, powder, interface rheology with Langmuir-Blodgett film method and dynamic surface tension
- More opening and compatible communication protocol of weighing
- Double-microchip processing technology with most powerful data handling capacity
- Upgradeable software, customized to meet your special measurement requirements

Advanced sample stage control system to fully enhance accuracy of traversing and positioning of sensing interfaces (e.g. platinum plate, DuNoüy ring)

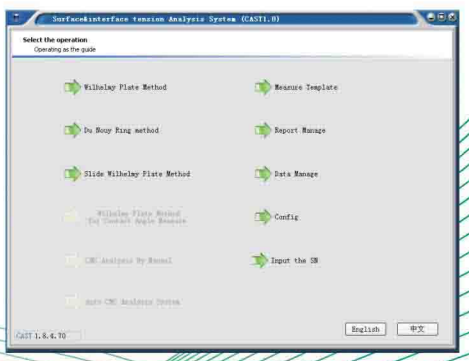
- USA KINO is the only enterprise that has comprehensively studied and produced precision vertical travel positioning stage and applied it into interface chemistry analytical system.
- We uniquely adopt coupler to connect motors and mechanical moving parts directly, which avoids problems of backlash and poor control accuracy caused by belt pulley connection structure.
- The adoption of auto control of stepping motor and motion control card fully enhanced accuracy and compatibility of positioning control. For special measurement requirements.

Anti-static design to improve measurement accuracy of surface/interface tensions (for option)

- USA KINO adopts ionic wind technology to avoid detection error of liquid-gas interface caused by electrostatic. When there's electrostatic existing, liquid interface will rise, sensing interface (plate or ring) will contact with it ahead of time, hence measurement value of surface tension will be larger than normal, for example, measured value is 71.214mN/m with electrostatic and 70.891mN/m when using antistatic kit.
- What is more, ion beam kit module is provided for better anti-static experience. The anti-static device will be always on during measurement. It's most effective in powder / fiber measurement to avoid powder electrostatic adsorption and deformation of single fiber.
- Usage of glass door with anti-static coating can effectively isolate conduction of electrostatic.

More software modules are available for more measurements of interface chemical analysis and weighing

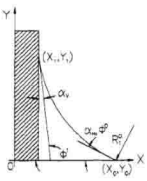
- SM01 Surface / interface tension measurement module
  SM01 is designed for measurement of static / dynamic surface tension of liquid-gas/liquid-liquid interface with three methods (modified Wilhelmy plate method, DuNoüy ring method, classical Wilhelmy plate method). Lenard Frame ring method, Lamella breakpoint analytical module and interface elasticity analytical module are optional available.
- SM02 Weight-based contact angle measurement module
  SM02 provides dynamic contact angle measurement by Wilhelmy plate method, contact angle measurement of single fiber by Wilhelmy plate method, modified Washburn method, extended Washburn method, thin-layer wicking Washburn method. It can be used for measurement of contact angle for plate, thin-layer, single fiber, fiber bundle, powder, as well as estimation of surface free energy of solid and its contributions like dispersive force, polar force, hydrogen bond value, estimation of adhesive work of solid and wettability analysis (wetting envelope) of solid.
- SM03 Full-automatic CMC measurement module
  SM03 is designed for auto-controlling syringe pump for dosing, which can determinate critical micelle concentration with forward/reversed/extended mode, calculation of surface excess and Gibbs free adsorption energy.
- SM04 Density measurement module
  SM04 is designed for measurement of density of liquid / solid.
- SM05 Measurement module of sedimentation & penetration, tensile force of single fiber
  SM05 is designed for measurement of sedimentation & penetration, analysis of penetrating power of thin plate / paper and measurement of tensile force of single fiber
- SM06 Module of size-distribution analysis via sedimentation velocity
  SM06 is designed for size-distribution analysis for nano-particles.
- SM07 Weighing module of analytical balance
  SM07 is equipped with all functions of analytical balance.
- SM08 Langmuir-Blodgett film and interface rheology analytical module
  SM08 is designed for interface rheology analysis with method of Langmuir-Blodgett film, surface oscillating and expanding method



$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin\phi}{X} + \frac{1}{R_1} \right\}$$

User–friendly surface/interface analytical module–SM01

- A variety of measurement methods available for you to make a comprehensive solution. USA KINO exclusively provides Wilhelmy plate based Young–Laplace equation correction method, modified Wilhelmy plate method, classical Wilhelmy plate method, and DuNoüy ring method.



- World Leading 3rd generation Wilhelmy plate method based Young–Laplace equation correction method can be used to dynamically correct the influence of contact angle and buoyancy.

Meniscus curve on alcohol–air–plate interface | Meniscus curve on water–air–plate interface | Meniscus curve on benzene–water–plate interface | Meniscus curve on n–butyl alcohol–water –plate interface

Meniscus Wetting Contour Profile

- USA KINO's innovative 3rd generation Wilhelmy plate method used Young–Laplace equation correction, in which method plate needn't be immersed and withdrawn in measuring process (such method is called zero buoyance method).

  It can be used for measuring dynamic & static surface & interface tension, viscosity sample (e.g. glycerin, ink, coatings, paints) and even high–viscosity sample of 10000CP (e.g. glues, resins), which enriches measurement

  Compared to zero buoyance method used by other companies, technologies from USA KINO can measure values of viscous samples and cationic surfactant; it can be applied more wide range and has higher precision.

  (1)Professional liquid–gas / liquid–liquid interface detection technology;

  (2)Professional FK buoyancy correction technology;

  (3)Professional zero point correction and preset value technology.

- Managing all dynamic live data

  (1)Software manages all live data that balance acquired. All data can be query and modified as well as exported to Excel.

  (2)Real–time display of data graph, with observation of interface tension changes.

  The function provides unparalleled convenience in measuring dynamic surface tension of time–dependent, medium–high viscosity sample, and volatile liquid or mixture.

- Database with abundant liquid data

  300 kinds of liquid with 800 data values can be directly used for analyzing surface free energy and its distributions of solid (such as Lewis acid and base components, hydrogen bond forces, polar force and dispersive force)

  (SM02 should be purchased)

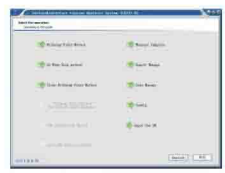
- Powerful database management

  (1)Real–time data storage and display, historical data searching, and eigenvalue modification are all available with CAST® 1.0.

  (2)CAST® 1.0 saves all measured data of dynamic value automatically and exports them into Excel.

- User–friendly language interface of CAST® 1.0

  The language interface of CAST® 1.0 adopts leading–edge unicode technology, providing you with a user–friendly operation interface. With it, different languages can be switched easily.



- Standardized measurement templates for different samples

  Various standardized measurement templates are available from USA KINO:

  (1)Measurement of surface tension and equilibrium surface tension as well as estimation of equilibrium time for surfactant.

  (2)Measurement of surface tension and equilibrium surface tension as well as estimation of equilibrium time for medium–high viscosity sample.

  (3)High–precision surface & interface tension measurement of pure liquid with fixed surface tension

  (4)Interface tension measurement, especially for plate–upward state in interface tension measurement.

  (5)Measurement of interface tension between monomolecular film and water, etc.

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos\theta$$

$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin\phi}{X} + \frac{1}{R_1} \right\}$$

$$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos\theta$$

Human-oriented operation process

- Universal USB2.0 communication interface provides stronger compatibility, higher speed, and convenient access to laptops and new-model desktops without RS232 interface.
- One-key zeroing and full-auto measurement with simple and convenient operation, minimizing errors caused by human operation.
- Humanizing pre-wetting function, designed for oily sample test.
  Some samples can't well wetting Wilhelmy plate or DuNoüy ring for the first time, especially for some oily sample. Our uniquely designed pre-wetting function can provide a more humanized solution for you in these cases.
- Multiple self-calibration functions to enhance measurement reliability
  Series A80 are equipped with both build-in weighing calibration and self-calibration functions of sensing interface (Wilhelmy plate and DuNoüy ring), which is much better than other manufacturers'. It can enable you to control the reliability of measured value more effectively.

Flexible accessories

- A variety of sensing interfaces
  Sensing interfaces confirm with international norms and standards, e.g. DuNoüy ring, Wilhelmy plate, Lenard frame ring and platinum cylinder, etc.

- Anti-static device of ion beam (optional)
  It is uniquely designed for conditions of powder and single fiber, which can eliminate the effect of electrostatic with switch on.

- Langmuir-Blodgett film trough (optional)
  SM08 -LB film and interface rheology analytical module is optional available.
  Oscillation mode (interface rheological analysis) , expansion mode (analysis of dynamic surface / interface chemical phenomena).

- All kinds of sample chambers
  (1)Sample chamber with magnetic stirrer (electromagnetics for option) for measurement of CMC (connecting to water circulator)

  (2)Sample chamber in different temperature conditions(SV01:-5-100℃ , Sv02: - 40 - 150℃ (with ceramic thermal-protective covering layer) , SV03: max. Temp. 250℃)

  (3)Digital temperature sensor made of semiconductor with temperature resolution of 0.01℃ and absolute temperature accuracy of down to 0.0625℃
  (4)Specific sample vessel for measurement of dynamic surface/interface tension values
- Density measurement kit
  Kit for solid / liquid density measurement.
- Holders and sample vessels
  USA KINO provides various containers and holders for plate, single fiber and powder.

$$\sigma \cdot \left\{ \frac{1}{R_1} + \frac{1}{R_2} \right\} = \sigma \cdot \left\{ \frac{\sin\phi}{X} + \frac{1}{R_1} \right\}$$

Technical Specifications

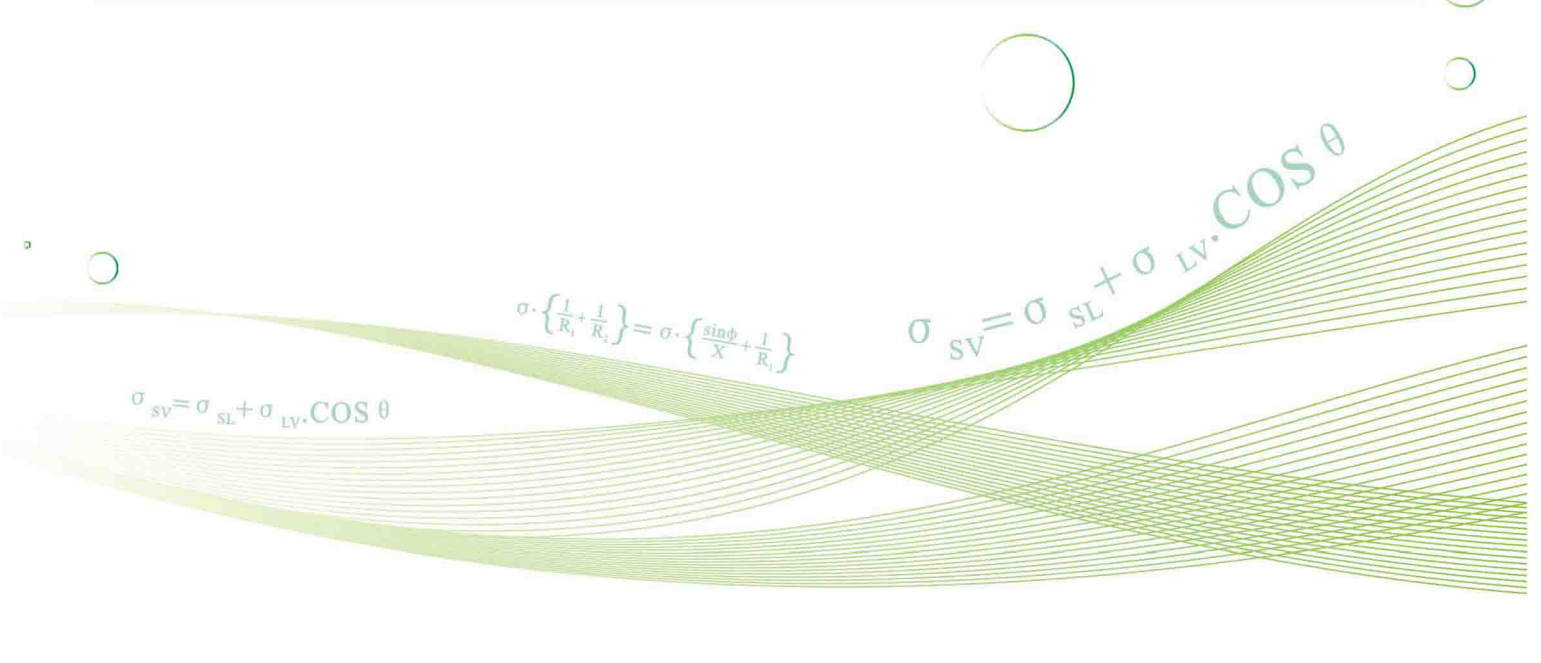
A801/A801S–Surface/interfacial tensiometer

Hardware specifications

1	Weighing Sensor	(1) Measuring Range	0–999.999mN/m
		(2) Resolution	0.0001mN/m
		(3) Weighing Accuracy	0.004mN/m
		(4) Weighing Capacity	220g
		(5) Weighing Readability	0.01mg
		(6) Data Update Speed	92 data/s
		(7) Data Processing	Double–chip processor
		(8) Zeroing Method	One–key zeroing with presetting functions
2	Sample Stage Control	(1) Lifting Range	0–100mm
		(2) Lifting Accuracy	Travel resolution:0.007μm; Repetitive positioning: 0.5μm
		(3) Control of Lifting Speed	Variable speed
		(4) Control Mode	Software–controlled via USB interface for better compatibility
		(5) Positioning Readout Mode	Read by software encoder
3	Communication Interface	USB2.0 interface can be directly connected to laptops, without compatibility of RS232	
4	Temperature Readout (Relevant accessories should be optional purchased)	Temp. Sensor	Digital semiconductor temperature sensor made in U.S.A.
		Temp. Calibration	Self–calibration
		Accuracy	0.01℃
		Readout Mode	Automatically read by software

Reference Specifications of CAST® 1.0 (software module SM01)

1	Measuring Method	4 methods, includes: ✓ Wilhelmy plate method based Young–Laplace equation ✓ Modified Wilhelmy plate method ✓ Classical Wilhelmy plate method ✓ DuNoüy ring method
2	Measuring Mode	Both automatic and manual mode in measurement of surface / interface tension
3	Standardized Measuerment Templates (Optional purchased or customized)	Various standardized measuerment templates are available from USA KINO: ✓Measuerment of surface tension and equilibrium surface tension as well as estimation of equilibrium time for surfactant. ✓Measuerment of surface tension and equilibrium surface tension as well as estimation of equilibrium time for medium–high viscosity sample. ✓High–precision surface & interface tension measuerment of pure liquid with fixed surface tension ✓Interface tension measuerment, especially for plate–upward state in interface tension measurement. ✓Measuerment of interface tension between monomolecular film and water, etc.



4	Calibration	Self–calibration of platinum plate & platinum ring and build–in weighing sensor calibration
5	Pre–wetting Function	Providing human–oriented pre–wetting function
6	Interface Detection	Detection of interface of liquid–gas / liquid–liquid automatically by software
7	Buoyancy Correction	3 kinds of buoyancy correction modes, professional FK correction factor
8	Database Management	Real–time graph and storage, query of measured data and data Excel exportable
9	Softwares for Option	SM01 Surface/interface tension measurement module SM02 Weight–based contact angle measurement module SM03 Full–automatic CMC measurement module SM04 Density measurement module SM05 Measurement module of sedimentation & penetration, tensile force of single fiber SM06 Module of size–distribution analysis via sedimentation velocity SM07 Weighing module of analytical balance SM08 Langmuir–Blodgett film and interface rheology analytical module

General Specifications

1	Dimension	390L × 500W × 470Hmm
2	Weight	32Kg
3	Power Supply	100–240AC 50/60H_z
4	Power	40W

A802–Auto–CMC Analytical Module

1. Software–controlled single–channel syringe pump

- Software–controlled double–channel syringe pump;
- Software–controlled multiple–channel syringe pump;
- Dosing volume controlled module with anti–overflow mode

All above can be customized.

2. Sample chamber with magnetic stirrer

3. Specific software module (SM03)

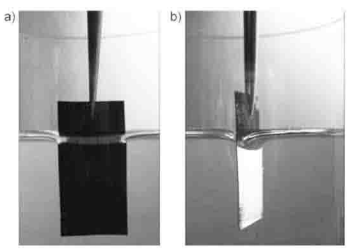
Note: It is recommended to confirm your technical schemes with our sales engineer before your purchase to ensure the system can meet all your demands.

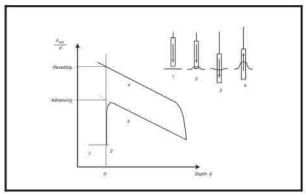
A803–Weight–based Contact Angle Meter (Software Module: SM02)

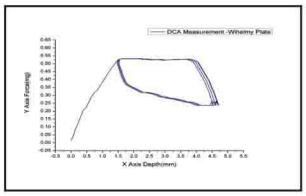
A803 has the same configuration with A801 except its extended function of weight–based contact angle

Hardware Specifications	
1 Contact Angle	(1) Measuring range: 0–180°
	(2) Resolution: 0.01°
2 Measuring Method	Weight–based method, Wilhelmy plate method
3 Types of Contact Angle	Dynamic contact angle, advancing/ receding contact angle, wettability analysis with balance
4 Estimating Surface Free Energy of Solid	12 kinds of calculation models, e.g. equation of state, Van Oss, Owens, Fowkes
5 Liquid Database	300 kinds of liquid with 800 data values

Accessories: special holders for film or plate







A804–Powder Contact Angle Meter (Software Module: SM02)

A804 has the same configuration with A801 except its extended function of powder contact angle measurement.

Hardware Specifications	
1 Contact Angle	(1) Measuring range: 0–90°
	(2) Resolution: 0.01°
2 Measuring Method	Weight–based method Washburn–based method

Accessories:

Glass capillary, special holder for powder.

Note: Please contact our engineers for confirmation before your purchase. It is not recommended for clients to purchase by yourselves.

$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos\theta$

$\sigma \cdot \left\{\frac{1}{R_1} + \frac{1}{R_2}\right\} = \sigma \cdot \left\{\frac{\sin\phi}{X} + \frac{1}{R_1}\right\}$

$\sigma_{SV} = \sigma_{SL} + \sigma_{LV} \cdot \cos\theta$

A805–Fiber Contact Angle Meter (Software Module: SM02)

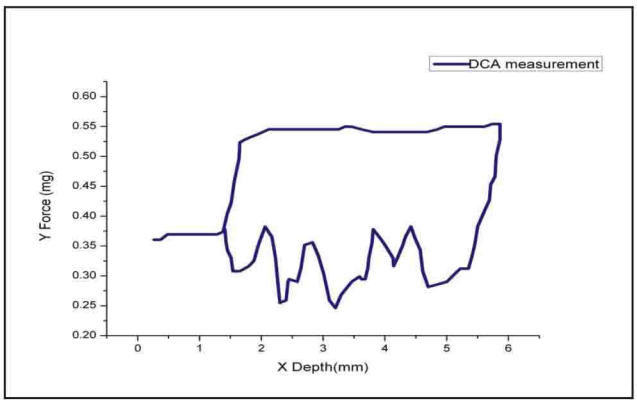
A805 has the same configuration with A801 except its extended function of fiber contact angle measurement.

Hardware Specifications	
1 Contact Angle	(1) Measuring range: 0–180°
	(2) Resolution: 0.01°
2 Measuring Method	Weight–based method Washburn–based method

Accessories:

Special sample holder for fiber, antistatic module (optional purchased)

Note: Please contact our engineers for confirmation before your purchase. It is not recommended for clients to purchase by yourselves.



Single fiber contact angle analysis is as reference in the graph

A806–Interface Chemistry Analytical Module

The system is a stand–alone analytical module based on high–precision weighing sensors with three different sensor resolutions: 0.01mN/m, 0.001mN/m, and 0.0001mN/m.

It is especially applicable for: surface tension customization system of on–site assembly line, e.g. quality control of electroplating line, single fiber contact angle measuerment, etc.

The module enables you to fully take advantage of analytical balance, which can achieve functions of high–precision weighing analysis and density measuerment.

Special Statements

1, The above production pictures and technical specifications are subject to change without notice; and the latest confirmed product information shall prevail.

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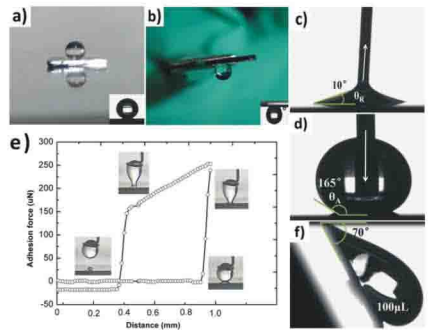

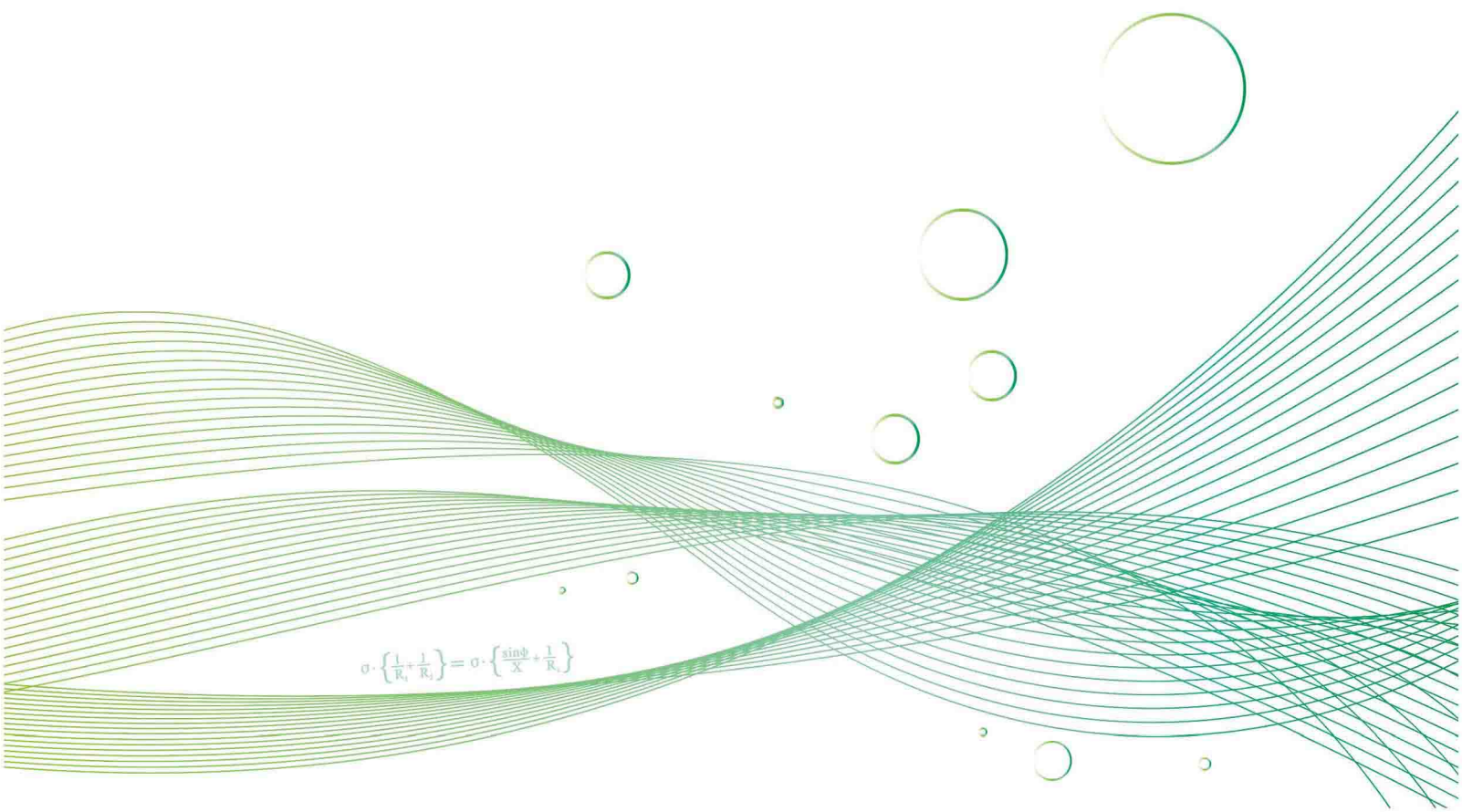

State of the art interface chemical analytical instruments from USA KINO provide you professional solutions. For more information, please visit
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