Kino

TX500™

Spinning Drop Interfacial Tensiometer

Model TX500C

– Basic Interface Chemical Analytical System Based on Spinning Drop Shape Analysis

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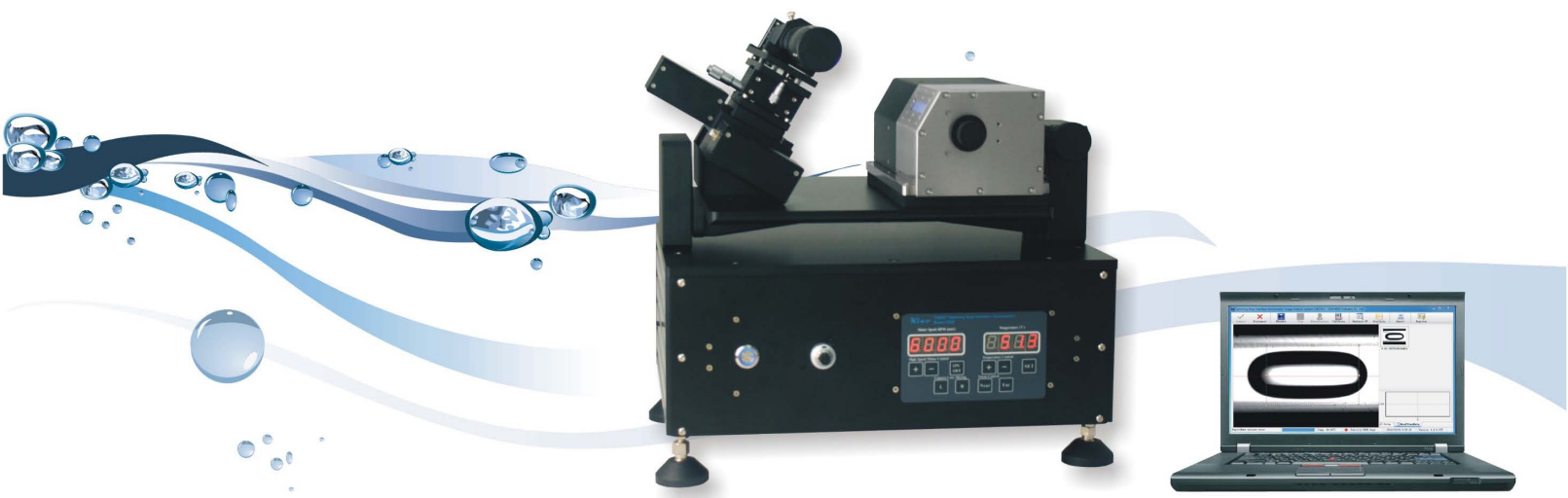


Spinning drop interfacial tensiometer model TX500C is entry–level and basic type from USA KINO, which adopts such technologies as removable and both–ends–fixed sample tube sampling mode (RBSM), full–self–sealed quartz glass tube (FSGT) and build–in heating system. The instrument can be independently controlled via control panel or controlled by software, which are both simple and comfortable to operate. It is used to measure interface tension down to 10^{-6}mN/m for analysis of dynamic interface tension, interface rheology and interfacial viscosity (oscillating drop method), surface elasticity, relaxation study, etc. It can be applied in fields of personal care product, tertiary oil recovery, micro emulsion, surfactant and more.

Applications

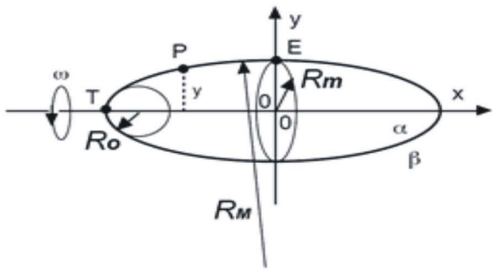
- Tertiary oil recovery
- Emulsion and polymer
- Pharmaceutical, pesticide, paint and coating
- Cosmetics and food industry
- Surfactant, soap and detergent

It's recommended to purchase full auto surface / interfacial tensiometer A601 / A101 for higher accuracy when the interface tension is above 1mN/m.

Spinning Drop Method Used for Ultra–low Interface Tension Measurement

Under conditions of constant temperature and constant pressure, interface free energy increases as interface area increases, the increment of interface energy per unit area is referred to as interface tension. Interface tension is formed for different attractive forces of molecules on both sides of interface to molecules on the interface. Spinning drop interfacial tensiometer can accurately analyze low / ultra–low interface tension, while normal methods such as Wilhelmy plate method and DuNoüy ring method are incapable of measuring such low values.

- In general, interface tension of 10^{-2}–10^{-1}mN/m is referred to as low interface tension and that of below 10^{-3}mN/m as ultra–low interface tension.
- To measure ultra–low interface tension, the original balance between gravity and interface tension should be artificially altered to enable the shape of balanced droplet can be easily measured. Making system rotate to increase action of centrifugal force field is the measurement principle of spinning drop ultra–low interface tension. As shown below.



Performance Features

Standard spinning drop interfacial tensiometer–TX500C is a basic and classical interface chemistry analytical instrument from USA KINO, consisting of removable rotation sample tube and build–in full–surface radiator heating system of aluminum alloy, etc. The instrument can be independently controlled via control panel or controlled by software, which enables both simple and comfortable to operate.

1. Patent removable and both–ends–fixed sample tube sampling mode (RBSM)

(1) Sampling mode with sample tube removable enables easier dosing and easier rinse of sample tube.

(2) Brand new patent technology of quartz glass tube with both ends opening, no extra bubble formed and easier to dosing and rinse

(3) Sample tube fixed of both ends in the spindle guarantees more stable and less rocking.

2. Build in heating system

Simply equipped gas–thermal temperature control system and full–surface radiator heating mode can be used to heat sample without any other temperature control device, which is more suitable for oil field operators.

For better and more accurate temperature control, please purchase instruments of other models.

3. DC motor with PID control system for more precise, smooth and stable

Control interface of RS232 and USB2.0 with better compatibility.

4. Illumination–adjustable cold LED light source

High brightness LED guarantees clearer and sharper drop edge, especially for analysis of muddy samples.

5. Sample tube levelness control mechanism used of upgraded rotation stage

By control levelness of high speed rotation chamber and vision system, it easily control of traversing speed of droplet during ultra–low interface tension measurement.

6. World–leading interface tension analytical system–CAST® 4.0 with comfortable and professional design

(1) Automatic dynamic interface tension analysis.

CAST® 4.0 will implement capture, image storage, calculation and display interface tension automatically at the touch of your finger, effectively avoiding errors caused by human. Furthermore, interface tension varying with time, rotating speed and temperature can also be measured, real–time displayed and exported to Excel.

(2)Interface tension calculation method based on distance between two boundary lines rather than two points enables more precise result.

(3) Humanized software design and database management

–Standard magnification calibration mode enables software automatically search magnification once lens zoom is determined.

–Wizard design of standard windows for various measurement operators.

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

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

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

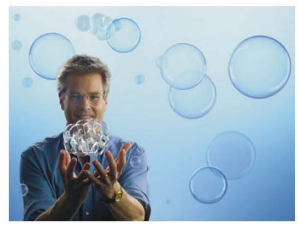
(4) Database management:

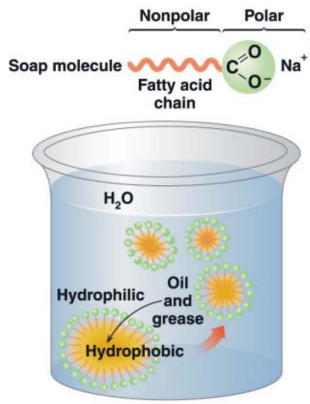
–Query and modifying historical data at any time.

–One–to–one correspondence between data and image; Double clicking picture to modify measured value; more convenient to query and retrieve data.

–Measured data is Excel exportable for you to create your measurement report conveniently.

–Secondary modification of eigenvalue: The software will record all your operation traces for you to check the measured data to avoid errors caused by human.





Technical Specifications

Principles	Measuring mode: capture image of spinning drop shape, record of motor speed, measuring geometric dimension of droplet, calculation of interface tension.	
1	Measuring Range	10^{-6}–100mN/m
2	Measuring Method	2 methods: Vonnegut, Bashford–Adams fitting based method
3	Motor Type	High–speed DC motor with 500 lines encoder
4	Motor Speed	1000–10000RPM
5	Control Accuracy of Motor	0.1%
6	Heating System	Build–in heating system
7	Voltage of Heating Rod	Inner type heating rod (Power supply:110–220VAC/24VDC for optional)
8	Temperature Probe	PT100
9	Display Range of Temp.	0–100℃
10	Control Range of Temp.	Ambient Temp. –85℃; Accurancy: ≈ ± 1℃
11	Temp. Resolution	0.1℃
12	Communication Interface	USB2.0 / Rs232
13	Zoom of Lens (Optical System)	Zoom 6.5:1
14	Magnification of Lens	0.7–4.5X
15	FOV	0–6mm
16	Resolution of Lens	0.001mm

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

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Principles	Measuring mode: capture image of spinning drop shape, record of motor speed, measuring geometric dimension of droplet, calculation of interface tension.	
17	Resolution of Camera	WVGA(752*480)
18	Camera Speed	87–340FPS
19	Transmission Speed of Camera	480M/S
20	Communication Interface	USB2.0
21	Background Light	LED light source
22	Luminance Brightness Control	Adjustable LED background light
23	Sample Tube's Levelness Control	Integral rotation mechanical system
24	Levelness Adjustment	Levelness adjustment of whole meter and lens, as well as integral rotation
25	Lens Control	Focus adjustment, levelness adjustment, spinning drop image tracking
26	Sample Tube ID	Self–sealed sample tube with both ends opening of 2,4,6mm ID
27	Fully Automatic Measurement	Just press "Measure", software will automatically capture, finding image edge, seeking sensitive spots and analyzing interface tension and displaying its time–dependent graph.
28	Database Management	One–to–one correspondence between image and measured value, data query, image and data Excel exportable.
29	Storage of Modification Traces	Data can be modified and its operation traces can be saved.
30	Data Export	Images and data can be exportable to BMP and Excel
31	Live Image Window	All drop images here can real–time observation
32	Software Control	Setting and reading of rotation speed, temperature and focus distance adjustment, droplet position tracking
33	Real–time Graph	Real–time display graph of time–dependent interface tension
34	Calibration	Professional optical system and standard wire for calibration
35	Power Supply	110–220V AC, 150W

Standard Components and Accessories

1.one mainframe (computer is not included in the standard configuration)
2.one set of vision system
3.two RS–232 serial cable,1 USB cable
4.one power supply cable
5.five needles of 10cm length
6.two sample tubes with inner diameter of 4,6mm and both ends opening
7.two self–sealed sample tubes with inner diameter of 2mm and both ends opening
8.five set of sample plugs for seal of centrifuge tube
9.two caps of spindle
10.one sample tube with standard wire for calibration

State of the art interface chemical analytical instruments from USA KINO provide you professional solutions. For more information, please visit
http:// www.uskino.com www.kinochina.com

Kino

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