Kino

TX500™

Spinning Drop Interfacial Tensiometer & Contact Angle Meter

Model TX500H

–Excellent Interface Chemical Analytical System Based on Drop Shape Analysis

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–Excellent Interface Chemical Analytical System Based on Drop Shape Analysis

Patent No. CN200920213959.8, CN200920213958.3

TX500H is the newest variant of interfacial tensiometer & contact angle meter from USA KINO, which represents USA KINO's most core technology of interface chemical instruments. This instrument fundamentally meets comprehensive needs for analysis of contact angle of solid–liquid, surface free energy of solid–gas and interface tension of liquid – liquid in tertiary oil recovery, which is the most powerful assistance for interface chemistry analysis in research institution of oil field, production institution, and universities.

Fields of Application

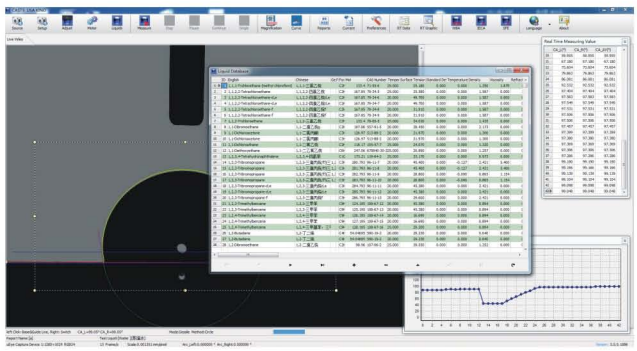
- Tertiary oil recovery
- Emulsion and polymer
- Pharmaceutical, pesticide, paint and coating
- Cosmetic and food industry
- CMC analysis of surfactant, soap & detergent,

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

Performance Features

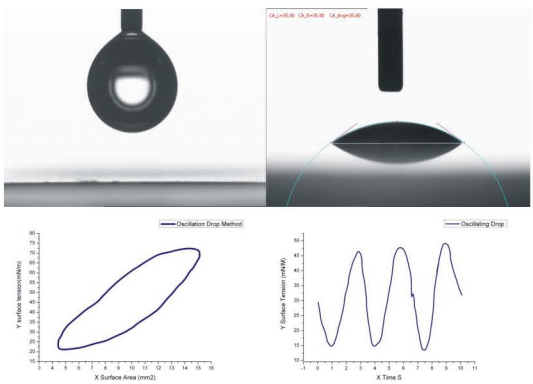
1. Comprehensive functions and budget –friendly

This instrument can complete both functions of optical contact angle meter and spinning drop interfacial tensiometer, which can be used to measure interface tension of liquid–liquid / liquid–gas, contact angle of liquid–solid, solid's surface free energy and its distribution, e.g. dispersive force, polar force, hydrogen bond value, Lewis acid, as well as wetting behavior analysis of solid material, and all other chemical parameters.



2. Diversified analytical methods

The instrument can enable analytical methods of spinning drop, pendant drop, sessile drop, tilted plate and more, which can meet extensive and complex measurement requirements in interface chemistry.

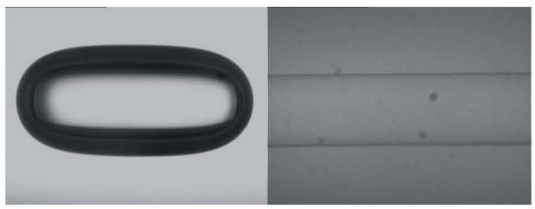


3. Automatic analytical process without errors caused by human

In the test process, instrument will automatically capture drop shape, find image edge, analyze sensitivity coefficient, and calculate test data without manual intervention, meanwhile it can conduct secondary modification and save its operation traces, effectively avoiding errors caused by human operation.

4. Superior optical imaging system with clearer and sharper drop image.

USA KINO provides lens with magnification of 0.3–4.5X, camera system with speed of 87–340FPS and interface of USB2.0. All these can enhance accuracy of measured values.



5. USA KINO's upgraded patent technology –gas thermal temperature control system

Designed to close to actual temperature, which is used to specifically get rid of major flaws caused by long time measurement and poor repetitiveness.

6. Powerful database management

One–to–one correspondence between data and image; historical data query, data Excel exportable, secondary modification and storage of operation traces.

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

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

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

Technical Parameters

Interface Chemical Analysis Based on Drop Shape Analysis CAST®3.0 & CAST®4.0

Variants	TX500H
1. General Specifications	
Measuring Range of Interface Tension	$10^{2}-10^{-6}$mN/m
Measuring Range of Contact Angle	0–180°
2. Hardware Specifications	
Zoom Range of Microscope Lens	0.7–4.5X / (optional with 9X, 18X)
Camera Resolution	WVGA (752*480) / (cameras with 130M, 300M, 500M resolutions are available)
Video Capture System	Video device of USB 2.0 / PCI video capture card and camera with 1394 interface are optional available CCD camera with speed of 87–340FPS (60FPS, 100FPS and 300FPS are optional available)
Lens Control	X Axis: Software–controlled drop image finding and FOV tracing Y Axis: Focus adjustment Z Axis: Drop imaging position adjustment R Axis: High–precision integral rotation positioning stage with lock function; For drop movement controlling Tilt control of camera lens
Control Range of Motor	0–15000 RPM
Motor Type	Servo control system, CVT of down to 1RPM
Control Accuracy of Motor	±3RPM
Control Mode	Encoder with 500 lines
Heating System	Gas–thermal temperature control mode
Control Range of Temp.	Ambient temp. +5–100℃
Control Accuracy of Temp.	±0.5℃
Heating Mode	Build–in full–surface radiator heating by electrical heating rod
Temperature Sensor	Digital semiconductor temperature sensor with self–calibration from U.S.A.; Accuracy: 0.0625℃
Temperature Control Range if With Water Circulator	0–100℃
Sample Tube	Sample tube made of quartz glass with inner diameter (ID) of 6mm, 4mm, 2mm
Self–seal Sample Tube	Inner diameter of 2mm, both ends opening
Standard Wire	Two–directional (horizontal and vertical) calibration (measurement ruler is optional)
Fixation Method of Sample Tube	Both ends fixed
Communication Interface	General interface of USB2.0
Levelness Control	Four–foot horizontal control, sample table rotation, and horizontal control of lens

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

3. CAST®4.0 –Software of spinning drop interfacial tensiometer

Calculation of Interface Tension	1. Automatically measuring upper and bottom boundary lines, calculating distance between them, then calculating IFT, and finally saving all data into database for management. 2. The measured data can be manually adjusted, and the operation traces will be saved. 3. One–to–one correspondence between measured data and picture
Calculation Method	Full–automatic, and secondary manual modification with its operation trace recorded
Magnification Calibration	Calibration of horizontal and vertical magnification
Database Management	Historical data can be regularly saved and managed by database. One–to–one correspondence between data and image; query, modification, operation traces recording, as well as Excel and BMP exporting
Software Control Function	Temperature, high speed motor, X axes (tracking images of liquid)
Capture Method	Single capture, continuous capture, capture with 25–60 pictures per second or timing capture, such as 20–minute capture interval and 2–hour total measurement time

4. Software specifications of optical contact angle

Sample Stage	1. Z–direction travel range: 50mm, accuracy: 0.01mm 2. Levelness adjustment of sample stage 3. Size of sample table: 50*50mm
Dosing System and Its Control	1. High–precision manual syringe pump, accuracy: 0.02μL (the software–controlled is optional) 2. Disposable needle of OD 0.5mm, 0.3mm, stainless, PTFE, etc. 3. Focus and field of view control XYZ 12.5mm, accuracy: 0.01mm
Rotation Stage	Integral rotation stage, for measurement of roll off / advancing / receding contact angle with curve fitting function of CAST®3.0.

5. Software specifications of optical contact angle

Drop Shapes	Pendant drop, sessile drop, captive bubble, tilted plate, spinning drop
Measuring Method	θ /2, circle fitting, ellipse fitting, RealDrop™, curve ruler, spline, Young–Laplace equation fitting
Measuring Functions	Measurement of static contact angle , dynamic contact angle (advancing / receding contact angle, time–dependent contact angle), surface free energy of solid, spinning drop surface / interface tension, WBA
Surface Free Energy of Solid	Exclusively provided methods for estimating surface free energy, such as Equation of State (Neumann et al.), Good–Girifalco, Owen–Wendt–Rabel, Simple Fowkes, Extended Fowkes, WU method 1–2, Schultz method 1–2, Acid–base (Van OSS & Good), Jhu, and Zizman Plot (critical surface tension) method, can be used to measure surface free energy and its distribution (dispersive force, polar force and hydrogen bond value, and Lewis acid–base, etc.) of low/high energy solid surface.
Software Triggering	Unique dual–software triggering technology for detection of zero–time contact angle in analyzing powder, paper and other hygroscopic materials and also for the whole–process capture of small contact angle measurement.
Database Management	Historical data can be query, Excel exportable and secondary modification.

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