

ID N° 23035 - Contact Angle Measurement - M4st

Executed on Aug 28, 2023, by M. Breitwieser

Cu-Blech (0.7mm)

*** Probe lag in Zellstoff - direkte Verwendung !?!?!

KEINE REINIGUNG DIE OBERFLÄCHE AS IS

Screening-Sequenz. Start /Ende mit statischer Messung *** 22:09:56 #Charaterisierung Sequenz A .

 • Kupfer / Isooktan 99.5+% : (20,0°C, 8,4', 20mm, 0,0496mm/s - static; θ -superwetting)

 $\theta_{C,s} = 0 \pm 0^\circ$ CAH 0° , $\bar{a}E_s = 19,450 \pm 0,031$ mN/m $\bar{a}H_s = -0,135$ mN/m, $\bar{B}_{\%,s} = 103,7\%$

Report

2. ===== Collection of Measurements in this Series Kupfer / Isooktan 99.5+% =====

Tabelle 1.2: Conditions and Results

N°	IDN°	θ	$\Delta\tau$	\bar{v}_z	\bar{C}_a	t_{eq}	θ_M	CAH	$\bar{a}H$	$\bar{a}E$	$\pm\sigma$	\bar{S}	$\bar{B}_{\%,Isookta...}$
	...erData39	[°C]	[min]	[mm/s]	[1]	[s]	[°]	[°]	[mN/m]	[mN/m]	[mN/m]	[m]/m ²	[%]
1.	23035 ₀	20	**0**	»0,0487«	-	3,05	<0>	<0>	-0,135	19,450	±0,031	0,700	103,7%
2.	23036 ₁	20,008	+24,3	10,0	2,65E-4	5,4	<5>	<10>	-1,62	19,9	±1,8	1,15	106,2%
3.	23037 ₂	20,01	+25,3	5,00	1,32E-4	5,8	<19>	<-38>	9,95	19,66	±0,27	0,910	104,8%
4.	23038 ₃	20,012	+26,4	2,50	6,61E-5	6,2	<12>	<-25>	5,484	19,76	±0,14	1,01	105,4%
5.	23039 ₄	20,015	+27,7	1,25	3,31E-5	5,5	<8>	<-16>	3,569	19,814	±0,057	1,06	105,7%
6.	23040 ₅	20,013	+29,4	0,625	1,65E-5	5,9	<0>	<0>	1,651	19,726	±0,047	0,976	105,2%
7.	23041 ₆	20,008	+31,4	0,313	8,27E-6	6,3	<0>	<0>	1,026	19,743	±0,014	0,993	105,3%
8.	23042 ₇	20,008	+34,9	0,156	4,13E-6	0,4	<0>	<0>	0,598	19,806	±0,017	1,06	105,6%
9.	23043 ₈	19,998	+40,5	<0,957>	2,51E-5	5,3	<0>	<0>	2,169	20,339	±0,093	1,59	108,5%
10.	23044 ₉	20,004	+42,0	<0,710>	1,87E-5	5,6	<0,5>	<-1>	2,420	19,991	±0,086	1,24	106,6%
11.	23045 ₁₀	20,013	+43,9	<0,318>	8,43E-6	12,5	<0>	<0>	1,201	20,120	±0,055	1,37	107,3%
12.	23046 ₁₁	20,013	+47,1	<0,357>*	9,42E-6	0,1	<0>	<0>	1,429	20,310	±0,049	1,56	108,3%
13.	23047 ₁₂	20,007	+50,1	<0,422>*	1,11E-5	0,1	<0>	<0>	1,218	20,24	±0,13	1,49	108,0%
14.	23048 ₁₃	20,008	+52,6	<0,392>*	1,04E-5	0,1	<0>	<0>	1,039	19,98	±0,10	1,23	106,6%
15.	23049 ₁₄	20,001	+55,3	<1,69>	4,45E-5	0,1	<8>	<-15>	3,12	19,62	±0,31	0,870	104,6%
16.	23050 ₁₅	19,998	+56,6	<1,93>	5,10E-5	0,1	<9>	<-17>	4,09	19,94	±0,34	1,19	106,3%
17.	23051 ₁₆	19,991	+57,7	<2,55>	6,73E-5	0,1	<16>	<-31>	6,15	19,14	±0,25	0,390	102,1%
18.	23052 ₁₇	19,994	+58,8	<4,43>	1,16E-4	0,1	<12>	<-24>	8,134	21,17	±0,24	2,42	112,9%
19.	23053 ₁₈	19,995	+60,5	<12,0>	3,17E-4	0,0	<90>	<-180>	974,86	-464,45	±0,15	-483	-2477,1%

This table provides an overview of the measurements in this series. Each separate M4 measurement is referenced by IDN°. The highlighted row indicates the data set of the measurement documented below. The column labeled θ shows the measurement temperature, $\Delta\tau$ the time interval to previous/following measurements, \bar{v}_z the movement speed - where additional symbols clarify: »n« indicates static measurements, <n> represents distance-accelerated movement of the triple line, * stands for continuous acceleration and a number without any symbol indicates a constant movement speed, \bar{C}_a is the capillary number, t_{eq} is the equilibration time before turnaround - but for static measurements the number denotes the average equilibration time as a levelling time between the measurement points, θ_M is the mean of the advancing and receding contact angle ('<n>' signs "errors"), contact angle hysteresis is given in degrees (CAH) and in energy units ($\bar{a}H$), $\bar{a}E$ is the mean adhesion energy, and $\pm\sigma$ is the corresponding standard deviation, \bar{S} is the mean of the spreading parameter, and $\bar{B}_{\%,Isookta...}$ indicates the relative wettability ($B_{\%,lqsl}/md... = 100\% \cdot \bar{a}E/\gamma$).

 Tabelle 2.2: Summary of sample weights in the individual measurements (initial weight $W_0 = 6,6487$ g)

N°	W_A	ΔW_{A-0}	W_E	ΔW_{E-0}	V_{E-0}	ΔV_{E-A}
	[g]	[mg]	[g]	[mg]	[μ L]	[μ L]
1.	6,6487	0,0	6,6505	1,8	2,6	2,6
2.	6,6505	1,8	6,6569	8,2	11,9	9,2
3.	6,6566	7,9	6,6546	5,9	8,5	-3,3
4.	6,6543	5,6	6,6533	4,6	6,6	-1,9
5.	6,6532	4,5	6,6524	3,7	5,3	-1,3
6.	6,6521	3,4	6,6519	3,2	4,6	-0,72
7.	6,6518	3,1	6,6518	3,1	4,5	-0,14
8.	6,6515	2,8	6,6520	3,3	4,8	0,29
9.	6,7554	106,7	6,6531	4,4	6,4	1,6
10.	6,7560	107,3	6,6530	4,3	6,2	-0,14
11.	6,7560	107,3	6,6525	3,8	5,5	-0,72
12.	6,7556	106,9	6,6524	3,7	5,3	-0,14
13.	6,7558	107,1	6,6529	4,2	6,1	0,72
14.	6,7560	107,3	6,6528	4,1	5,9	-0,14
15.	6,7559	107,2	6,6547	6,0	8,7	2,7
16.	6,7567	108,0	6,6549	6,2	9,0	0,29
17.	6,7570	108,3	6,6557	7,0	10,1	1,2
18.	6,7573	108,6	6,6575	8,8	12,7	2,6
19.	6,6573	8,6	1,2084	-5440,3	-7862,7	-7,9E+03

Symbols: W_A : Total weight before each measurement, ΔW_{A-0} : Change in weight from the initial weight W_0 at the start of the series, W_E : Total weight after the measurement (possibly including the weight of any adherent fluid), ΔW_{E-0} : Change in weight from the initial weight W_0 at the start of the series, V_{E-0} : Weight change interpreted as fluid volume, ΔV_{E-A} : Fluid volume change calculated as the difference between W_E and W_A . (Automated weighings without contact to the surface of the fluid).

3. ===== Measurement IDN°23035: Static Contact Angle =====

Kupfer, cubic plate 25,5×0,684mm

 20mm Kupfer \ Isooktan 99.5+%, $\gamma = 18,75$ mN/m

 $\theta = 20,0^\circ$

 Contact Angle, CA θ_C
 $<0 \pm 0^\circ>$

- superwetting -

Contact Angle Hysteresis, CAH_s <0°>

	Advancing $\theta_{A,s}$	Receding $\theta_{R,s}$	Transition - mm
Contact Angles, θ_s	0°	0°	0° _{adv.} ⇒ 0° _{rec.}
Rated measurements $n_{mm-range}$	101 0,000 - 20,001mm	108 20,001 - 1,000mm	2 20,001 - 19,951mm
avg. Triple line speed \bar{v}_z [mm/s]	0,0496 ±0,0720	-0,0478 ±0,630	
avg. Step distance Δh_0 [mm]	0,200 ±1,73E-04	-0,178 ±0,0536	
avg. equilibration Time t_{eq} [s]	3,16 ±0,728	2,94 ±0,528	

Static Contact Angle Measurement: For superwetting - consider adhesion parameters for analysis. The avg. equilibration Time t_{eq} is the mean of the time between positioning and acquiring the wetting force. The criterion of force equilibrium is defined in the utilized IMPro.

Adhesion Force of the equilibrated Triple Line

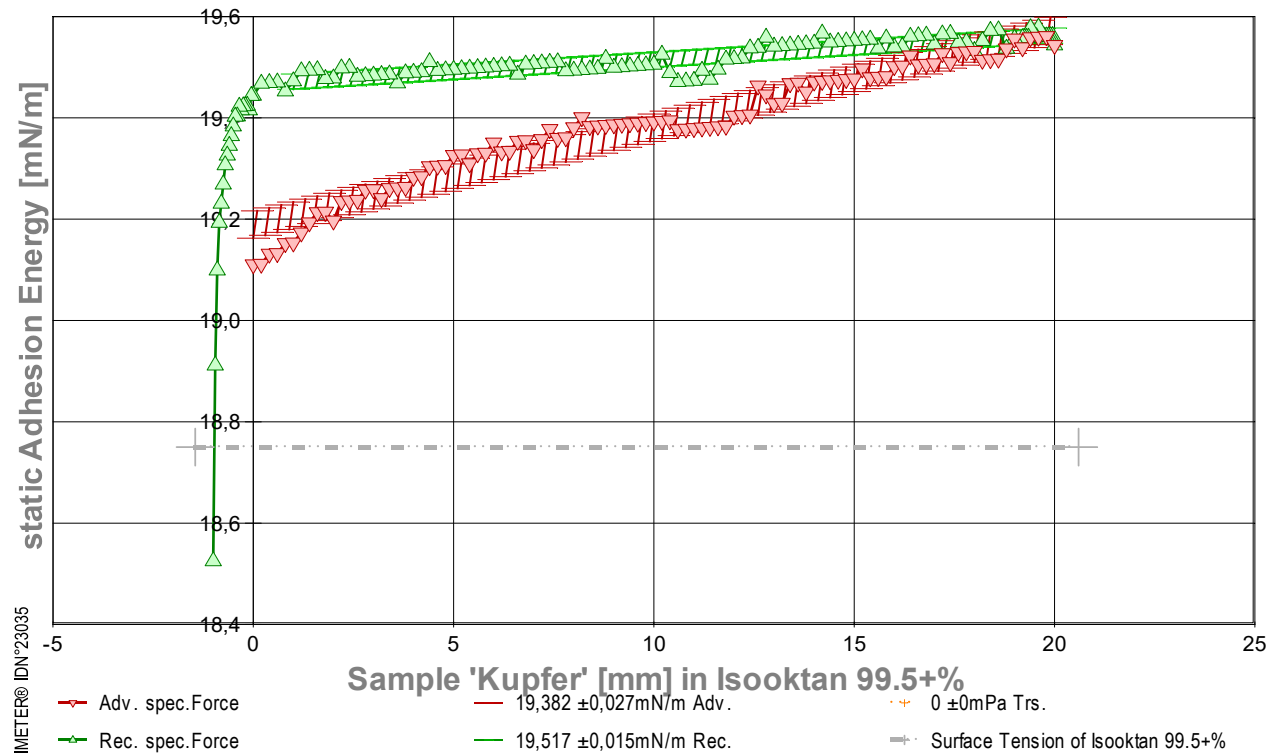
Energy of Adhesion, ${}^a\bar{E}_s = ({}^aE_A + {}^aE_R) / 2$ **19,450 ±0,031 mN/m**

Hysteresis, ${}^aH_s = {}^aE_A - {}^aE_R$ -0,135 mN/m
 Parameter of spreading, $\bar{S}_s = {}^a\bar{E} - \gamma$ 0,700 mJ/m²
 relative wettability, $\bar{B}_{\%s} = 100 \cdot {}^a\bar{E} / \gamma$ 103,7% with Isooktan 99.5+%

	Advancing ${}^aE_{A,s}$	Receding ${}^aE_{R,s}$	Transition - mm
Energy of Adhesion, aE_s [mN/m]	19,382	19,517	19,562 _{<adv.>} ⇒ 19,561 _{rec.}
Standard deviation ${}^a\sigma$ [mN/m]	±0,027	±0,015	±0
Linear regression, slope [mPa]	0,019	0,005	0
correlation coefficient r^2	0,947	0,79	1,0
Relative wettability, $B_{\%s}$	103,4%	104,1%	

Data has left the region of measurable Contact Angles. resolving a kind of superwetting: ${}^aE_{A,R} > \gamma \cdot \cos\theta$ and wettability $B > 100\%$

- Diagramm 1.3: 'Triple-line Force²' static forces at the triple line, $\bar{v}_z = 0,049$ mm/s



- Das Diagramm zeigt den Verlauf der Adhäsionsenergie aE entlang der Probenoberfläche. Den Messwerte werden bei unbewegtem Pegel des Fluids am Probekörper als statische Gleichgewichtszustände bestimmt. Die roten ∇ -Markierungen stehen für adv.-Messwerte (Eintauchen; von links nach rechts aufgezeichnet), grüne Δ -Markierungen gehören zu rec.-Werten (Rückzugsbewegung; von rechts nach links laufend). Die Oberflächenspannung von Isooktan 99.5+% ist als grau gestrichelte Horizontale bei 18,75 mN/m eingezeichnet; sie gibt die maximale Zugfestigkeit an, die eine flüssige Isooktan 99.5+%-Oberfläche aushalten kann. Es zeigt sich, die Adhäsionsenergie zwischen Isooktan 99.5+% und Kupfer übersteigt die Oberflächenspannung. Diese Überbenetzung (Superwetting) ist gekennzeichnet durch die Kontaktwinkelproblematik, gemäß tatsächlich $\cos(\theta) > 1$ eintritt. Falls andere Störeinflüsse (ggf. elektrostatische, rheologische) auszuschließen sind, kommen Grenzschicht- und/oder tribologische Effekte in Frage, die den lokalen Wert der Oberflächenspannung raumgreifend - oder den Wert einer ungeklärten Zusatzkraft an der Triple Line - vergrößern und das Geschehen modifizieren könnten.

4. ===== Details on the Measurement and Setup =====

Sample: 'Kupfer', **Form:** cubic plate, face dimension 25,5 x 0,684 mm.

Test Liquid: 'Isooktan 99.5+%' at 20°C: density 0,69191 g/mL, surface tension 18,75 mN/m, viscosity 0,496 mPa·s; Capillary length 1,7 mm.

Suspension/Fixation: by operator.

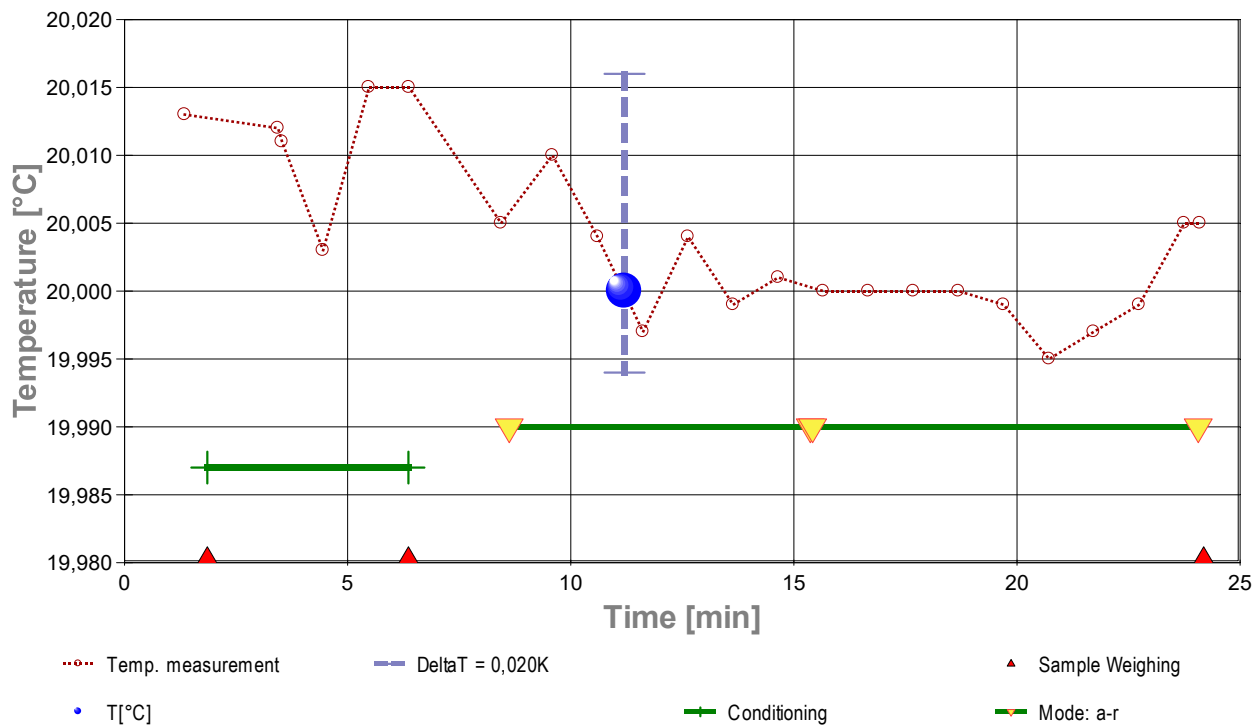
Vessel: tempered double wall measuring cell, height 140 mm, inclosing sample and liquid at coherent temperature and atmosphere; Surface area ∞ by CLT. - The 'CLT' Constant-Level-Technic prevents rising/falling of the Isooktan 99.5+%-level in the vessel (surface 1452mm²) through immersion/emersion of the sample volume in the vessel by appropriate pumping of Isooktan 99.5+%.

Conditioning: during 2,9 min in the measuring cell above the surface of the liquid.

Sample Weight: at start 6,6488 g, after conditioning 6,6487 g, after the measurement 6,6505 g.

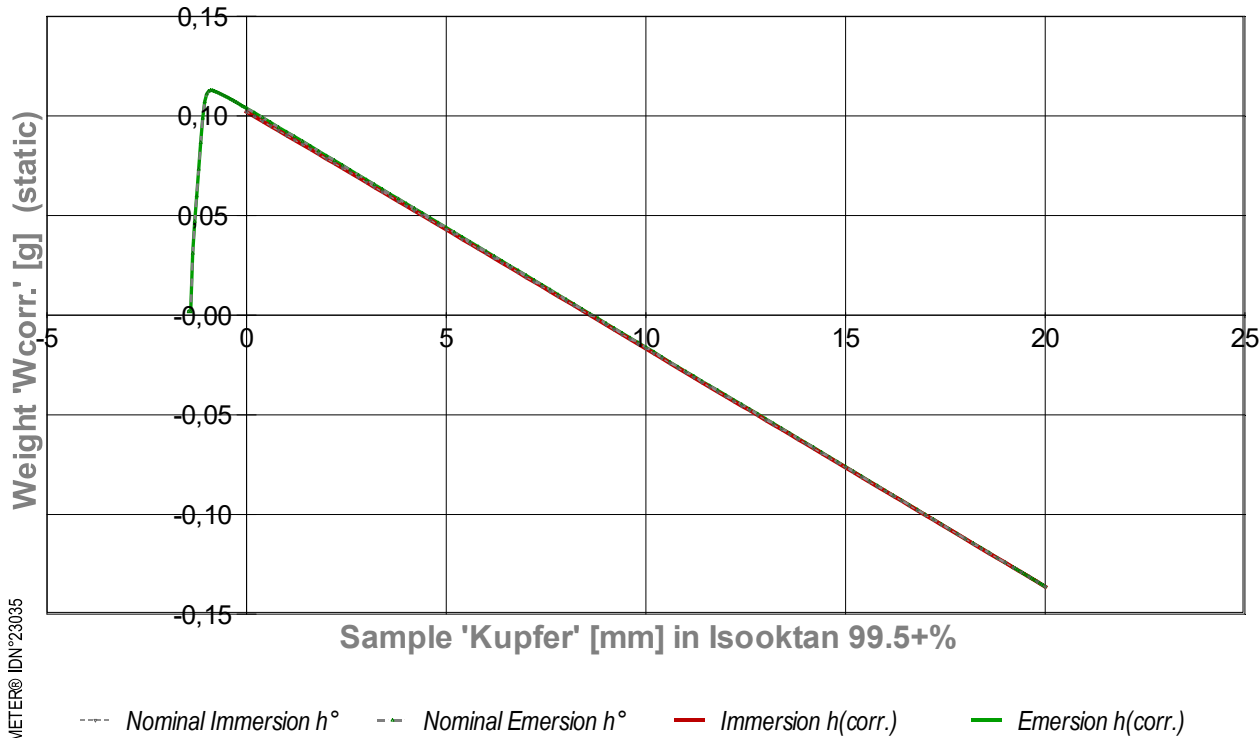
Loss in weight during conditioning -0,0001 g (-21 ppm) but different after measurement 0,0016 g (+0,25‰).

Measurement algorithm: static CA-measurement, acquisition of equilibrated values, stepwise movement. Maximum immersion of 20,001 mm and force equilibration at the inflection point for 3,6 s. Duration for immersion 6,8 min, for emersion 1,6 min.



- Das Diagramm "Temperature & Events"²¹ dokumentiert neben der Flüssigkeitstemperatur der Messfluids (Isooktan 99.5+%) die zeitliche Abfolge der Verfahrensschritte. Die Temperaturmesswerte sind als kleine Kreise abgebildet; die kugelförmige Marke gibt die der Messung insgesamt zugeordnete Temperatur an (20°C). Markierungen auf der horizontalen grünen Linie bilden das Zeitintervall der Konditionierung ab, das auf das Einsetzen der Probe folgt. Weitere gelbe Dreiecke auf der grünen Horizontalen bezeichnen die Schaltung jeweiliger Messmodi ('a-r' bedeutet *Advancing*- und *Receding*-Bewegung). Die roten Dreiecke, unten im Diagramm, markieren die Zeitpunkte der Probenwägung von Kupfer (ohne Kontakt zur Fluidoberfläche).

- Diagramm 3.4: 'RawData'²¹ -- Acquired weights during immersion and emersion (raw data and immersion corrected lengths)



- Im Diagramm "RawData"²¹ werden die Wägewerte zur statischen Kontaktwinkelmessung gegen die Eintauchtiefe der Probe abgebildet. Von den Roh-Wägewerten W_{RAW} wurden Proben- und Aufhängungsgewichte subtrahiert, so dass hier die *Gewichte* der Benetzung- und Auftriebskräfte abgebildet werden ($W_{corr.}$). Die Kurvenverläufe fallen mit der Eintauchtiefe h (*immersion depth*) ab, indes der Volumenauftrieb des eintauchenden Probekörpers zunimmt. Im Diagramm sind Wägewerte für die *advancing*- und *receding*-Bewegung eingetragen, sowohl für nominelle (h_0) und für korrigierte Eintauchtiefen ($h_{corr.}$). Die roten Dreiecke bezeichnen die Messwerte bei $h_{corr.}$ bei der Vorwärtsbewegung (*adv.*), die grünen Dreiecke gehören zu Auszugsbewegungen (*rec.*). Durch "CLT" (die *Constant-Level-Technic*) wird die Pegelveränderung besonders durch das ein- und austauchendes Probenvolumen simultan kompensiert, sodass die nominelle Eintauchtief mit der tatsächlichen identisch ist; die Kurven sind deshalb praktisch deckungsgleich. Weiterhin zeigt das Diagramm noch Werte zu *negativen Eintauchtiefen*. Diese Wertepaare gehören der *Kapillarbrücke* ($cb = capillary bridge$) an, die sich beim Herausziehen der Probe über das Flüssigkeitsniveau deutlich ausbilden kann; besonders, wenn das Probenende scharfkantig ist.

5. ===== Table of raw data and results =====

The table below provides the data for each contact angle measuring position in this experiment ($n=234$). - Within a row the column t lists the time of the CA-measurement. $t_{eq.}$ is the duration reach the equilibrated force after positioning (static measurement). The nominal distance between the sample bottom flatface and the liquid surface is given by h_0 , whilst $h_{corr.}$ shows the corrected

immersion depth- *due to CLT the values are the same.* With W_{RAW} the stabilized total weight of the sample, sample holder, wetting force and buoyancy is written. The $W_{corr.}$ -values* are former weighing values when the weight of the sample and its holder is subtracted. After buoyancy- correction, aF is the force exerted on the triple line. The Energy of Adhesion ${}^aE_{A,R} = {}^aF/p$ is the force of adhesion per meter of the circumference (p) of the sample. θ is the Contact Angle. The last column indicates by **chr** the advancing resp. receding state; **cb** tags values of a 'capillary bridge' above the surface-level.

(Resolving static force of wetting from ${}^aF = (W_{RAW} - W_0 - W_{Buoy.}) \cdot g + F_{Buoy.air}$) * $W_{corr.} = W_{RAW} - W_0$ (with $W_0 = 6,6487$ g).

Table 3.5: Data table

N°	t [min]	t _{eq.} [sec]	h ₀ [mm]	h _{corr.} [mm]	W _{RAW} [g]	W _{corr.} [g]	aF [mN]	${}^aE_{A,R}$ [mN/m]	θ [°deg]	chr
1.	0,00	3,2	0,000	0,000	6,7507	0,1020	1,0008	19,11	0	a
2.	0,07	3,1	0,200	0,200	6,7483	0,0996	1,0008	19,11	0	a
3.	0,13	3,9	0,400	0,400	6,7460	0,0973	1,0019	19,13	0	a
4.	0,21	3,0	0,600	0,600	6,7436	0,0949	1,0019	19,13	0	a
5.	0,28	2,5	0,800	0,800	6,7413	0,0926	1,0030	19,15	0	a
6.	0,34	2,5	1,000	1,000	6,7389	0,0902	1,0030	19,15	0	a
7.	0,39	2,5	1,200	1,200	6,7366	0,0879	1,0041	19,17	0	a
8.	0,45	2,6	1,400	1,400	6,7343	0,0856	1,0051	19,19	0	a
9.	0,51	2,8	1,600	1,600	6,7320	0,0833	1,0062	19,21	0	a
10.	0,57	3,0	1,800	1,800	6,7296	0,0809	1,0062	19,21	0	a
11.	0,64	2,9	2,000	2,000	6,7271	0,0784	1,0053	19,20	0	a
12.	0,70	2,4	2,200	2,200	6,7249	0,0762	1,0073	19,24	0	a
13.	0,76	3,0	2,400	2,400	6,7225	0,0738	1,0074	19,24	0	a
14.	0,82	2,5	2,600	2,600	6,7201	0,0714	1,0074	19,24	0	a
15.	0,88	3,0	2,800	2,800	6,7178	0,0691	1,0085	19,26	0	a
16.	0,94	3,0	3,000	3,000	6,7154	0,0667	1,0085	19,26	0	a
17.	1,01	3,5	3,200	3,200	6,7129	0,0642	1,0076	19,24	0	a
18.	1,08	3,0	3,400	3,400	6,7106	0,0619	1,0087	19,26	0	a
19.	1,15	3,0	3,600	3,600	6,7082	0,0595	1,0087	19,26	0	a
20.	1,21	3,0	3,800	3,800	6,7058	0,0571	1,0088	19,26	0	a
21.	1,27	2,6	4,000	4,000	6,7035	0,0548	1,0098	19,28	0	a
22.	1,33	3,0	4,200	4,200	6,7011	0,0524	1,0099	19,28	0	a
23.	1,40	6,4	4,400	4,400	6,6988	0,0501	1,0109	19,30	0	a
24.	1,52	3,2	4,600	4,600	6,6964	0,0477	1,0110	19,31	0	a
25.	1,59	3,1	4,800	4,800	6,6940	0,0453	1,0110	19,31	0	a
26.	1,65	3,0	5,000	5,000	6,6917	0,0430	1,0121	19,33	0	a
27.	1,72	4,4	5,200	5,200	6,6893	0,0406	1,0121	19,33	0	a
28.	1,81	3,0	5,400	5,400	6,6868	0,0381	1,0112	19,31	0	a
29.	1,87	3,0	5,600	5,600	6,6845	0,0358	1,0123	19,33	0	a
30.	1,94	3,0	5,800	5,800	6,6821	0,0334	1,0123	19,33	0	a
31.	2,00	3,6	6,000	6,000	6,6798	0,0311	1,0134	19,35	0	a
32.	2,08	3,0	6,200	6,200	6,6773	0,0286	1,0124	19,33	0	a
33.	2,14	3,0	6,400	6,400	6,6749	0,0262	1,0125	19,33	0	a
34.	2,20	2,9	6,600	6,600	6,6726	0,0239	1,0135	19,35	0	a
35.	2,27	2,6	6,800	6,800	6,6702	0,0215	1,0136	19,36	0	a
36.	2,32	3,5	7,000	7,000	6,6677	0,0190	1,0127	19,34	0	a
37.	2,40	3,0	7,200	7,200	6,6654	0,0167	1,0137	19,36	0	a
38.	2,46	3,0	7,400	7,400	6,6631	0,0144	1,0148	19,38	0	a
39.	2,53	3,0	7,600	7,600	6,6606	0,0119	1,0138	19,36	0	a
40.	2,59	3,0	7,800	7,800	6,6582	0,0095	1,0139	19,36	0	a
41.	2,65	3,0	8,000	8,000	6,6559	0,0072	1,0149	19,38	0	a
42.	2,72	2,5	8,200	8,200	6,6536	0,0049	1,0160	19,40	0	a
43.	2,77	3,0	8,400	8,400	6,6511	0,0024	1,0151	19,38	0	a
44.	2,84	3,0	8,600	8,600	6,6487	0,0000	1,0151	19,38	0	a
45.	2,90	3,0	8,800	8,800	6,6463	-0,0024	1,0152	19,39	0	a
46.	2,97	3,6	9,000	9,000	6,6439	-0,0048	1,0152	19,39	0	a
47.	3,04	4,2	9,200	9,200	6,6415	-0,0072	1,0153	19,39	0	a
48.	3,13	2,9	9,400	9,400	6,6391	-0,0096	1,0154	19,39	0	a
49.	3,19	3,0	9,600	9,600	6,6367	-0,0120	1,0154	19,39	0	a
50.	3,25	2,9	9,800	9,800	6,6343	-0,0144	1,0155	19,39	0	a
51.	3,32	3,0	10,000	10,000	6,6319	-0,0168	1,0155	19,39	0	a
52.	3,38	3,0	10,200	10,200	6,6295	-0,0192	1,0156	19,39	0	a
53.	3,45	3,9	10,400	10,400	6,6271	-0,0216	1,0157	19,39	0	a
54.	3,53	3,0	10,600	10,600	6,6246	-0,0241	1,0147	19,38	0	a
55.	3,59	2,5	10,800	10,800	6,6222	-0,0265	1,0148	19,38	0	a
56.	3,65	3,0	11,000	11,000	6,6198	-0,0289	1,0149	19,38	0	a
57.	3,71	3,0	11,200	11,200	6,6174	-0,0313	1,0149	19,38	0	a
58.	3,77	2,9	11,400	11,400	6,6150	-0,0337	1,0150	19,38	0	a
59.	3,84	3,0	11,600	11,600	6,6126	-0,0361	1,0150	19,38	0	a
60.	3,90	3,0	11,800	11,800	6,6102	-0,0385	1,0151	19,38	0	a
61.	3,96	3,4	12,000	12,000	6,6079	-0,0408	1,0161	19,40	0	a
62.	4,04	3,5	12,200	12,200	6,6055	-0,0432	1,0162	19,41	0	a
63.	4,11	3,0	12,400	12,400	6,6031	-0,0456	1,0163	19,41	0	a
64.	4,18	3,4	12,600	12,600	6,6010	-0,0477	1,0193	19,46	0	a
65.	4,25	4,0	12,800	12,800	6,5985	-0,0502	1,0183	19,45	0	a
66.	4,33	3,0	13,000	13,000	6,5960	-0,0527	1,0174	19,43	0	a
67.	4,39	2,9	13,200	13,200	6,5936	-0,0551	1,0175	19,43	0	a
68.	4,46	3,9	13,400	13,400	6,5914	-0,0573	1,0195	19,47	0	a
69.	4,54	2,6	13,600	13,600	6,5890	-0,0597	1,0196	19,47	0	a
70.	4,59	2,9	13,800	13,800	6,5865	-0,0622	1,0186	19,45	0	a
71.	4,66	3,4	14,000	14,000	6,5842	-0,0645	1,0197	19,47	0	a
72.	4,73	3,5	14,200	14,200	6,5818	-0,0669	1,0197	19,47	0	a
73.	4,80	3,0	14,400	14,400	6,5794	-0,0693	1,0198	19,47	0	a
74.	4,87	3,0	14,600	14,600	6,5770	-0,0717	1,0199	19,47	0	a
75.	4,93	2,6	14,800	14,800	6,5746	-0,0741	1,0199	19,48	0	a
76.	4,99	2,6	15,000	15,000	6,5722	-0,0765	1,0200	19,48	0	a
77.	5,05	3,6	15,200	15,200	6,5699	-0,0788	1,0210	19,50	0	a
78.	5,12	3,0	15,400	15,400	6,5674	-0,0813	1,0201	19,48	0	a
79.	5,19	4,4	15,600	15,600	6,5650	-0,0837	1,0202	19,48	0	a
80.	5,27	3,0	15,800	15,800	6,5626	-0,0861	1,0202	19,48	0	a
81.	5,34	2,9	16,000	16,000	6,5603	-0,0884	1,0213	19,50	0	a
82.	5,40	2,5	16,200	16,200	6,5579	-0,0908	1,0213	19,50	0	a
83.	5,46	3,9	16,400	16,400	6,5556	-0,0931	1,0224	19,52	0	a
84.	5,54	3,6	16,600	16,600	6,5531	-0,0956	1,0214	19,51	0	a
85.	5,62	3,0	16,800	16,800	6,5507	-0,0980	1,0215	19,51	0	a
86.	5,68	3,0	17,000	17,000	6,5483	-0,1004	1,0216	19,51	0	a
87.	5,74	2,5	17,200	17,200	6,5460	-0,1027	1,0226	19,53	0	a
88.	5,80	3,0	17,400	17,400	6,5435	-0,1052	1,0217	19,51	0	a
89.	5,87	3,1	17,600	17,600	6,5412	-0,1075	1,0227	19,53	0	a
90.	5,93	3,0	17,800	17,800	6,5388	-0,1099	1,0228	19,53	0	a

91.	6.00	2,5	18,000	18,000	6,5364	-0,1123	1,0228	19,53	0	a
92.	6.05	3,5	18,200	18,200	6,5339	-0,1148	1,0219	19,51	0	a
93.	6.13	2,5	18,400	18,400	6,5315	-0,1172	1,0220	19,52	0	a
94.	6.19	3,4	18,600	18,600	6,5291	-0,1196	1,0220	19,52	0	a
95.	6.26	3,0	18,801	18,801	6,5268	-0,1219	1,0231	19,54	0	a
96.	6.32	7,9	19,000	19,000	6,5245	-0,1242	1,0241	19,56	0	a
97.	6.47	2,6	19,201	19,201	6,5220	-0,1267	1,0232	19,54	0	a
98.	6.53	4,9	19,401	19,401	6,5197	-0,1290	1,0242	19,56	0	a
99.	6.62	3,0	19,601	19,601	6,5173	-0,1314	1,0243	19,56	0	a
100.	6.69	3,0	19,801	19,801	6,5149	-0,1338	1,0244	19,56	0	a
101.	6.75	3,0	20,001	20,001	6,5124	-0,1363	1,0234	19,54	0	a
102.	6.81	2,5	19,951	19,951	6,5131	-0,1356	1,0244	19,56	0	r
103.	6.86	2,6	19,901	19,901	6,5137	-0,1350	1,0244	19,56	0	r
104.	6.92	3,0	19,851	19,851	6,5143	-0,1344	1,0244	19,56	0	r
105.	6.98	2,5	19,801	19,801	6,5149	-0,1338	1,0244	19,56	0	r
106.	7.03	3,4	19,751	19,751	6,5155	-0,1332	1,0244	19,56	0	r
107.	7.11	2,5	19,701	19,701	6,5161	-0,1326	1,0243	19,56	0	r
108.	7.16	3,0	19,651	19,651	6,5167	-0,1320	1,0243	19,56	0	r
109.	7.22	3,4	19,601	19,601	6,5174	-0,1313	1,0253	19,58	0	r
110.	7.29	2,6	19,551	19,551	6,5179	-0,1308	1,0243	19,56	0	r
111.	7.34	2,6	19,501	19,501	6,5185	-0,1302	1,0243	19,56	0	r
112.	7.40	2,5	19,451	19,451	6,5191	-0,1296	1,0243	19,56	0	r
113.	7.45	3,1	19,401	19,401	6,5198	-0,1289	1,0252	19,58	0	r
114.	7.51	5,8	19,351	19,351	6,5203	-0,1284	1,0242	19,56	0	r
115.	7.62	2,5	19,301	19,301	6,5209	-0,1278	1,0242	19,56	0	r
116.	7.67	3,0	19,251	19,251	6,5215	-0,1272	1,0242	19,56	0	r
117.	7.73	2,5	19,201	19,201	6,5221	-0,1266	1,0242	19,56	0	r
118.	7.79	2,6	19,001	19,001	6,5245	-0,1242	1,0241	19,56	0	r
119.	7.85	3,5	18,801	18,801	6,5268	-0,1219	1,0231	19,54	0	r
120.	7.92	3,0	18,601	18,601	6,5294	-0,1193	1,0250	19,57	0	r
121.	7.99	2,5	18,401	18,401	6,5318	-0,1169	1,0249	19,57	0	r
122.	8.04	3,0	18,201	18,201	6,5341	-0,1146	1,0239	19,55	0	r
123.	8.12	3,0	18,001	18,001	6,5364	-0,1123	1,0229	19,53	0	r
124.	8.19	3,0	17,801	17,801	6,5389	-0,1098	1,0238	19,55	0	r
125.	8.25	2,5	17,601	17,601	6,5413	-0,1074	1,0237	19,55	0	r
126.	8.31	3,0	17,401	17,401	6,5438	-0,1049	1,0246	19,57	0	r
127.	8.37	3,0	17,201	17,201	6,5462	-0,1025	1,0246	19,56	0	r
128.	8.43	3,5	17,001	17,001	6,5485	-0,1002	1,0235	19,55	0	r
129.	8.51	3,0	16,801	16,801	6,5510	-0,0977	1,0245	19,56	0	r
130.	8.57	2,7	16,601	16,601	6,5534	-0,0953	1,0244	19,56	0	r
131.	8.63	2,8	16,401	16,401	6,5558	-0,0929	1,0243	19,56	0	r
132.	8.69	3,0	16,201	16,201	6,5581	-0,0906	1,0233	19,54	0	r
133.	8.76	3,0	16,001	16,001	6,5605	-0,0882	1,0232	19,54	0	r
134.	8.82	3,0	15,801	15,801	6,5630	-0,0857	1,0242	19,56	0	r
135.	8.89	4,5	15,601	15,601	6,5653	-0,0834	1,0231	19,54	0	r
136.	8.98	3,0	15,401	15,401	6,5678	-0,0809	1,0240	19,55	0	r
137.	9.04	2,9	15,201	15,201	6,5702	-0,0785	1,0240	19,55	0	r
138.	9.11	3,4	15,001	15,001	6,5726	-0,0761	1,0239	19,55	0	r
139.	9.18	2,5	14,801	14,801	6,5750	-0,0737	1,0239	19,55	0	r
140.	9.24	3,0	14,601	14,601	6,5774	-0,0713	1,0238	19,55	0	r
141.	9.30	2,5	14,401	14,401	6,5798	-0,0689	1,0237	19,55	0	r
142.	9.36	3,0	14,201	14,201	6,5823	-0,0664	1,0247	19,57	0	r
143.	9.42	2,5	14,001	14,001	6,5846	-0,0641	1,0236	19,55	0	r
144.	9.48	3,5	13,801	13,801	6,5870	-0,0617	1,0236	19,55	0	r
145.	9.55	2,5	13,601	13,601	6,5894	-0,0593	1,0235	19,54	0	r
146.	9.61	2,6	13,401	13,401	6,5918	-0,0569	1,0234	19,54	0	r
147.	9.67	2,6	13,201	13,201	6,5942	-0,0545	1,0234	19,54	0	r
148.	9.73	2,5	13,001	13,001	6,5966	-0,0521	1,0233	19,54	0	r
149.	9.78	2,6	12,801	12,801	6,5991	-0,0496	1,0242	19,56	0	r
150.	9.84	2,5	12,601	12,601	6,6014	-0,0473	1,0232	19,54	0	r
151.	9.90	2,5	12,401	12,401	6,6038	-0,0449	1,0231	19,54	0	r
152.	9.96	2,6	12,201	12,201	6,6061	-0,0426	1,0221	19,52	0	r
153.	10.02	3,1	12,001	12,001	6,6085	-0,0402	1,0220	19,52	0	r
154.	10.08	3,5	11,801	11,801	6,6109	-0,0378	1,0220	19,52	0	r
155.	10.16	2,6	11,601	11,601	6,6132	-0,0355	1,0209	19,50	0	r
156.	10.21	2,6	11,401	11,401	6,6155	-0,0332	1,0199	19,48	0	r
157.	10.27	3,0	11,201	11,201	6,6180	-0,0307	1,0208	19,49	0	r
158.	10.34	3,1	11,001	11,001	6,6203	-0,0284	1,0198	19,47	0	r
159.	10.40	2,6	10,801	10,801	6,6227	-0,0260	1,0197	19,47	0	r
160.	10.46	2,6	10,601	10,601	6,6251	-0,0236	1,0197	19,47	0	r
161.	10.52	2,5	10,401	10,401	6,6276	-0,0211	1,0206	19,49	0	r
162.	10.58	2,5	10,201	10,201	6,6302	-0,0185	1,0225	19,53	0	r
163.	10.64	2,8	10,001	10,001	6,6325	-0,0162	1,0214	19,51	0	r
164.	10.70	3,1	9,801	9,801	6,6349	-0,0138	1,0214	19,50	0	r
165.	10.76	3,5	9,601	9,601	6,6373	-0,0114	1,0213	19,50	0	r
166.	10.84	2,9	9,401	9,401	6,6397	-0,0090	1,0213	19,50	0	r
167.	10.90	2,5	9,201	9,201	6,6421	-0,0066	1,0212	19,50	0	r
168.	10.96	3,0	9,001	9,001	6,6445	-0,0042	1,0211	19,50	0	r
169.	11.02	3,9	8,801	8,801	6,6470	-0,0017	1,0221	19,52	0	r
170.	11.10	3,2	8,601	8,601	6,6493	0,0006	1,0210	19,50	0	r
171.	11.17	2,6	8,401	8,401	6,6517	0,0030	1,0210	19,50	0	r
172.	11.23	2,9	8,201	8,201	6,6541	0,0054	1,0209	19,49	0	r
173.	11.29	3,0	8,001	8,001	6,6565	0,0078	1,0208	19,49	0	r
174.	11.35	2,5	7,801	7,801	6,6589	0,0102	1,0208	19,49	0	r
175.	11.41	5,4	7,601	7,601	6,6614	0,0127	1,0217	19,51	0	r
176.	11.52	3,0	7,401	7,401	6,6638	0,0151	1,0216	19,51	0	r
177.	11.58	3,0	7,201	7,201	6,6662	0,0175	1,0216	19,51	0	r
178.	11.65	2,8	7,001	7,001	6,6686	0,0199	1,0215	19,51	0	r
179.	11.71	2,9	6,801	6,801	6,6710	0,0223	1,0215	19,51	0	r
180.	11.77	2,5	6,601	6,601	6,6733	0,0246	1,0204	19,49	0	r
181.	11.83	2,5	6,401	6,401	6,6758	0,0271	1,0213	19,50	0	r
182.	11.88	3,4	6,201	6,201	6,6782	0,0295	1,0213	19,50	0	r
183.	11.96	2,5	6,001	6,001	6,6806	0,0319	1,0212	19,50	0	r
184.	12.01	2,5	5,801	5,801	6,6830	0,0343	1,0212	19,50	0	r
185.	12.07	3,4	5,601	5,601	6,6854	0,0367	1,0211	19,50	0	r
186.	12.14	3,2	5,401	5,401	6,6878	0,0391	1,0210	19,50	0	r
187.	12.21	2,5	5,201	5,201	6,6902	0,0415	1,0210	19,50	0	r
188.	12.27	3,5	5,001	5,001	6,6926	0,0439	1,0209	19,50	0	r
189.	12.34	3,0	4,801	4,801	6,6950	0,0463	1,0209	19,49	0	r
190.	12.40	3,0	4,601	4,601	6,6974	0,0487	1,0208	19,49	0	r
191.	12.47	3,4	4,401	4,401	6,6999	0,0512	1,0217	19,51	0	r
192.	12.54	3,0	4,201	4,201	6,7022	0,0535	1,0207	19,49	0	r
193.	12.61	2,5	4,001	4,001	6,7046	0,0559	1,0206	19,49	0	r

194.	12,66	2,6	3,800	3,800	6,7000	0,0583	1,0206	19,49	0	r
195.	12,72	3,0	3,600	3,600	6,7093	0,0606	1,0195	19,47	0	r
196.	12,79	2,9	3,400	3,400	6,7118	0,0631	1,0204	19,49	0	r
197.	12,85	2,5	3,200	3,200	6,7142	0,0655	1,0204	19,48	0	r
198.	12,91	3,5	3,000	3,000	6,7166	0,0679	1,0203	19,48	0	r
199.	12,98	3,0	2,800	2,800	6,7190	0,0703	1,0203	19,48	0	r
200.	13,05	3,1	2,600	2,600	6,7214	0,0727	1,0202	19,48	0	r
201.	13,11	3,0	2,400	2,400	6,7239	0,0752	1,0211	19,50	0	r
202.	13,18	2,6	2,200	2,200	6,7263	0,0776	1,0211	19,50	0	r
203.	13,24	2,9	2,000	2,000	6,7286	0,0799	1,0200	19,48	0	r
204.	13,31	2,6	1,800	1,800	6,7310	0,0823	1,0200	19,48	0	r
205.	13,36	3,0	1,600	1,600	6,7335	0,0848	1,0209	19,49	0	r
206.	13,43	3,0	1,400	1,400	6,7359	0,0872	1,0208	19,49	0	r
207.	13,49	3,0	1,200	1,200	6,7383	0,0896	1,0208	19,49	0	r
208.	13,56	2,6	1,000	1,000	6,7406	0,0919	1,0197	19,47	0	r
209.	13,62	3,0	0,800	0,800	6,7429	0,0942	1,0187	19,45	0	r
210.	13,68	3,6	0,600	0,600	6,7454	0,0967	1,0196	19,47	0	r
211.	13,75	2,5	0,400	0,400	6,7478	0,0991	1,0196	19,47	0	r
212.	13,81	3,6	0,200	0,200	6,7502	0,1015	1,0195	19,47	0	r
213.	13,89	1,7	0,000	0,000	6,7525	0,1038	1,0182	19,44	0	r
214.	13,93	1,7	-0,050	-0,050	6,7531	0,1044	1,0182	19,44	0	cb
215.	13,97	1,8	-0,100	-0,100	6,7535	0,1049	1,0167	19,42	0	cb
216.	14,01	1,7	-0,150	-0,150	6,7542	0,1055	1,0172	19,42	0	cb
217.	14,06	1,6	-0,200	-0,200	6,7548	0,1061	1,0172	19,42	0	cb
218.	14,10	1,8	-0,250	-0,250	6,7554	0,1067	1,0172	19,42	0	cb
219.	14,14	3,0	-0,300	-0,300	6,7560	0,1073	1,0167	19,42	0	cb
220.	14,21	1,6	-0,350	-0,350	6,7566	0,1079	1,0171	19,42	0	cb
221.	14,25	1,7	-0,400	-0,400	6,7571	0,1084	1,0161	19,40	0	cb
222.	14,29	1,7	-0,450	-0,450	6,7577	0,1090	1,0161	19,40	0	cb
223.	14,33	1,7	-0,500	-0,500	6,7582	0,1095	1,0151	19,38	0	cb
224.	14,37	1,6	-0,550	-0,550	6,7587	0,1100	1,0141	19,36	0	cb
225.	14,41	1,6	-0,600	-0,600	6,7592	0,1105	1,0131	19,35	0	cb
226.	14,46	1,8	-0,650	-0,650	6,7597	0,1110	1,0121	19,33	0	cb
227.	14,50	1,6	-0,700	-0,700	6,7602	0,1115	1,0111	19,31	0	cb
228.	14,54	1,7	-0,750	-0,750	6,7606	0,1119	1,0091	19,27	0	cb
229.	14,58	1,7	-0,800	-0,800	6,7610	0,1123	1,0071	19,23	0	cb
230.	14,62	1,8	-0,850	-0,850	6,7614	0,1127	1,0051	19,19	0	cb
231.	14,67	1,9	-0,900	-0,900	6,7615	0,1128	1,0022	19,10	0	cb
232.	14,71	1,6	-0,950	-0,950	6,7611	0,1124	0,9903	18,91	0	cb
233.	14,75	3,8	-1,000	-1,000	6,7596	0,1110	0,9701	18,53	8,88	cb
234.	14,83	3,7	-1,050	-1,050	6,7558	0,1071	0,9264	-	19,36	cb

Meldungen

Die Rückzugs- bzw. Receding- Bewegung ist aus 3 Zügen zusammengesetzt.

Temperaturangaben beziehen sich auf die Skala der ITS-90. **Standardabweichungen:** Verschiedentlich werden Regressionsfunktionen mit Standardabweichungen bzw. Varianzen qualifiziert. Diese Angaben werden berechnet aus der Summe der Quadrate der Abweichungen der Einzelwerte zu jeweils berechneten Funktionswerten dividiert durch die Anzahl der Werte weniger 1. Sofern nicht anders bezeichnet, werden für ±(Standardmess-)Unsicherheiten einfache Standardabweichungen - ohne Erweiterungsfaktoren - angegeben, d.h. die Überdeckung betrifft 67% der Werte.

IMPro Execution & Audit-Trail

Data created during execution of the IMPro "ContactAngle_atConstantLevel, 02.06.23, 104997", type 4/4. Time Period of the Accomplishment: Aug., 28. 2023 between 22:08:35 and 22:32:54, elapsed time: 20 minutes. IMPro finished as projected. The complete Report first was presented on Aug., 29.23 at 00:15. Audit-Log: The Original data is unchanged, nevertheless there are entries to the Log, made while the IMPro was executing:

Start of this IMPro 22:17:09, - Backup of the IMPro configuration:

Time Variables: Abs. Positions/Way: Immersion_Depth 20mm, Platform_StartPosition 85mm.

Rel. Positions/Way: FeedRateAdv 0,2mm, FeedRateRec -0,2mm, FeedRate_for_adv_rec_turn -0,050mm.

Others: Determin_0_at_Repetition -1 [Y/N].StirringTime 0s. Stirrer-Speed Orps. Record_Air_Density -1, Temperature-Outside-Warning 0,

Automatic_Thermostat_available -1.

ab 8. Wdh mit Entnahme und Abtupfung*

#Wilhelmy-Plate-Sequence (erstes statisch, dann speed-up dyn): 1x stat, dann v=v*1.5 ... mm/s dyn, Besch.l.g = 43 [%]; Sequ.N° 1/21; _Equi_Time: 0,350s, _Equi_Crit: 0,0001g, _Equi_loops: 5s, _Equi_loopsRepeater: 2 [n]x. Immersion_Depth: 20mm, ConditioningTime: 180s.v8,50=149µL, Measurement : CLT STATIC, PumpN°1 [n], Vol. 2,50 [cm³], FüllVolumen 0,5 [cm³], FreiVolumen 2 [cm³], VolBilanz 0,3511, PFlussRate 8,72µL/s, DichteDerFlüssigkeit 0,6919 [g/cm³].

v8,62=-3,49µL,v8,69=-3,49µL,v8,77=-3,49µL,v8,83=-3,49µL,v8,89=-3,49µL,v8,95=-3,49µL,v9,01=-3,49µL,v9,07=-3,49µL,v9,13=-3,49µL,v9,19=-3,49µL,v9,26=-3,49µL,v9,31=-3,49µL,v9,38=-3,49µL,v9,43=-3,49µL,v9,50=-3,49µL,v9,56=-3,49µL,v9,64=-3,49µL,v9,70=-3,49µL,v9,77=-3,49µL,v9,83=-3,49µL,v9,89=-3,49µL,v9,95=-3,49µL,v10,07=-3,49µL,v10,14=-3,49µL,v10,21=-3,49µL,v10,28=-3,49µL,v10,36=-3,49µL,v10,43=-3,49µL,v10,49=-3,49µL,v10,56=-3,49µL,v10,63=-3,49µL,v10,70=-3,49µL,v10,76=-3,49µL,v10,82=-3,49µL,v10,88=-3,49µL,v10,95=-3,49µL,v11,02=-3,49µL,v11,08=-3,49µL,v11,15=-3,49µL,v11,21=-3,49µL,v11,27=-3,49µL,v11,33=-3,49µL,v11,39=-3,49µL,v11,46=-3,49µL,v11,52=-3,49µL,v11,60=-3,49µL,v11,68=-3,49µL,v11,75=-3,49µL,v11,81=-3,49µL,v11,87=-3,49µL,v11,94=-3,49µL,v12,00=-3,49µL,v12,08=-3,49µL,v12,15=-3,49µL,v12,20=-3,49µL,v12,27=-3,49µL,v12,33=-3,49µL,v12,39=-3,49µL,v12,46=-3,49µL,v12,52=-3,49µL,v12,59=-3,49µL,v12,67=-3,49µL,v12,73=-3,49µL,v12,80=-3,49µL,v12,88=-3,49µL,v12,95=-3,49µL,v13,01=-3,49µL,v13,09=-3,49µL,v13,15=-3,49µL,v13,21=-3,49µL,v13,29=-3,49µL,v13,36=-3,49µL,v13,42=-3,49µL,v13,49=-3,49µL,v13,55=-3,49µL,v13,60=-3,49µL,v13,68=-3,49µL,v13,74=-3,49µL,v13,83=-3,49µL,v13,89=-3,49µL,v13,96=-3,49µL,v14,02=-3,49µL,v14,10=-3,49µL,v14,17=-3,49µL,v14,24=-3,49µL,v14,30=-3,49µL,v14,36=-3,49µL,v14,42=-3,49µL,v14,49=-3,49µL,v14,55=-3,49µL,v14,61=-3,49µL,v14,68=-3,49µL,v14,74=-3,49µL,v14,81=-3,49µL,v14,88=-3,49µL,v15,02=-3,49µL,v15,08=-3,49µL,v15,18=-3,49µL,v15,24=-3,49µL,v15,31=-3,49µL,v15,37=0,872µL,v15,42=0,872µL,v15,48=0,872µL,v15,54=0,872µL,v15,59=0,872µL,v15,67=0,872µL,v15,72=0,872µL,v15,78=0,872µL,v15,85=0,872µL,v15,91=0,872µL,v15,96=0,872µL,v16,01=0,872µL,v16,07=0,872µL,v16,18=0,872µL,v16,23=0,872µL,v16,29=0,872µL,v16,35=3,49µL,v16,41=3,49µL,v16,48=3,49µL,v16,54=3,49µL,v16,60=3,49µL,v16,68=3,49µL,v16,74=3,49µL,v16,81=3,49µL,v16,86=3,49µL,v16,93=3,49µL,v16,99=3,49µL,v17,06=3,49µL,v17,13=3,49µL,v17,19=3,49µL,v17,25=3,49µL,v17,31=3,49µL,v17,38=3,49µL,v17,44=3,49µL,v17,53=3,49µL,v17,60=3,49µL,v17,66=3,49µL,v17,73=3,49µL,v17,79=3,49µL,v17,86=3,49µL,v17,91=3,49µL,v17,98=3,49µL,v18,04=3,49µL,v18,11=3,49µL,v18,17=3,49µL,v18,22=3,49µL,v18,28=3,49µL,v18,34=3,49µL,v18,40=3,49µL,v18,46=3,49µL,v18,51=3,49µL,v18,57=3,49µL,v18,64=3,49µL,v18,71=3,49µL,v18,77=3,49µL,v18,83=3,49µL,v18,89=3,49µL,v18,96=3,49µL,v19,02=3,49µL,v19,08=3,49µL,v19,13=3,49µL,v19,19=3,49µL,v19,25=3,49µL,v19,32=3,49µL,v19,39=3,49µL,v19,45=3,49µL,v19,51=3,49µL,v19,58=3,49µL,v19,66=3,49µL,v19,72=3,49µL,v19,78=3,49µL,v19,85=3,49µL,v19,91=3,49µL,v19,97=3,49µL,v20,07=3,49µL,v20,14=3,49µL,v20,20=3,49µL,v20,26=3,49µL,v20,33=3,49µL,v20,38=3,49µL,v20,44=3,49µL,v20,51=3,49µL,v20,57=3,49µL,v20,63=3,49µL,v20,70=3,49µL,v20,76=3,49µL,v20,82=3,49µL,v20,90=3,49µL,v20,96=3,49µL,v21,02=3,49µL,v21,10=3,49µL,v21,16=3,49µL,v21,22=3,49µL,v21,28=3,49µL,v21,34=3,49µL,v21,41=3,49µL,v21,47=3,49µL,v21,54=3,49µL,v21,60=3,49µL,v21,67=3,49µL,v21,74=3,49µL,v21,80=3,49µL,v21,86=3,49µL,v21,92=3,49µL,v21,98=3,49µL,v22,05=3,49µL,v22,11=3,49µL,v22,17=3,49µL,v22,23=3,49µL,v22,31=3,49µL,v22,37=3,49µL,v22,44=3,49µL,v22,49=0,00µL,v22,53=0,867µL,v22,57=0,65µL,v22,62=0,939µL,v22,66=0,867µL,v22,70=0,867µL,v22,77=0,809µL,v22,81=0,925µL,v22,85=0,723µL,v22,89=0,867µL,v22,93=0,723µL,v22,98=0,723µL,v23,02=0,723µL,v23,06=0,723µL,v23,10=0,723µL,v23,14=0,578µL,v23,18=0,578µL,v23,23=0,578µL,v23,27=0,145µL,v23,32=-0,578µL,v23,39=-2,11µL,v23,47=-5,58µL,v23,55=-12,0µL,v23,63=-17,6µL,v23,71=-19,4µL,v23,80=-19,4µL,v23,88=-18,4µL,v23,96=-23,2µL,v24,03=-42,2µL,v24,07=0,00µL,

The Number **23035** refers to the Recordset in the Database '*imeterData39*' where all Information can be retrieved at any time.

Prüfmittel

Das Wägesystem (WZA224) wurde während dieser Messung justiert. Die letzte vollständige Prüfung der Positioniervorrichtung von **IMETER** (ID23903733) erfolgte am 01.08.23. Technische Daten: Auflösung des Wägesystems 0,1 mg, Messunsicherheit (Linearität) 0,2 mg, Dichte der Justiermasse ρ_{cal} 8,00 g/cm³, Luftdichte ρ_{air} vgl. Tabelle unten; Schwerebeschleunigung g 9,80769 m/s². Pt100-Temperaturmessung: Auflösung 0,001 K, Messunsicherheit $\pm 0,01$ K, R° 100.0056 Ω , Kalibrierintervall 30 min (BN^o1, -41/200°C, 3S, FS15,8, Korrekturfunktion: -0,0054 +0,997591 $\cdot\vartheta$ +2,20165E-05 $\cdot\vartheta^2$ -4,78431E-08 $\cdot\vartheta^3$). Die Messauflösung der sekundären Temperaturmessung beträgt 0,01 K, die Unsicherheit 0,03 K. Akquisitions-Softwareversion IMETER 7.4.21, LizenzN^o *3037-4759*, W. 6.2,9200- Betriebssystem auf PC Ser.N^o6995684 (C, SSD).

Justierung der Wägezelle während der Messung:

at 1,3 min, Adjustment 0 ** passed **

Die während der Messung automatisch ausgeführten Wägezellen-Justierungen sind mit relativem End-Zeitpunkt und korrigierter Abweichung oberhalb dokumentiert (die kompletten Kalibrier- und Justierprotokolle sind in der Datei 'imeterData39.cal' gesondert gespeichert).

Meteorologische Angaben, Luftdichte:

Time [min]	ϕ [%]	T_a [°C]	p_a [kPa]	ρ_{air} [kg/m ³]
0,1	47,48	28,50	95,07	1,09014

Obige Zusammenstellung gibt die Aufzeichnung der Atmosphärendaten für den Aufstellort wieder; darin bedeuten ϕ relative Luftfeuchte (r.H.), T_a Lufttemperatur und p_a absoluter Luftdruck, ρ_{air} die Luftdichte; Die Luftdichte wird dabei aus den Druck-, Temperatur- und Luftfeuchtwerten berechnet.
