

ID N° 22717 - Contact Angle Measurement - M4st

Executed on Mai 24, 2023, by M. Breitwieser

Cu-Blech

Screening-Sequenz. Start /Ende mit statischer Messung *** 20:07:21 #Charaterisierung Sequenz A.

Probe mit Wasser, Tensid und viel Wasser gereinigt, abgetrocknet und mit der Messflüssigkeit auf Zellstoff abgerieben.

 • Kupfer / Isooktan 99.5+% : [20,0°C, 8,4', 20mm, 0,0489mm/s - static; θ -superwetting]

 $\theta_{C,s} = 0 \pm 0^\circ$ CAH 0°, ${}^a\bar{E}_s = 19,318 \pm 0,020$ mN/m ${}^aH_s = -0,003$ mN/m, $\bar{B}_{\%s} = 103,0\%$

Report

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

Tabelle 1.2: Conditions and Results

N°	IDN° ...erData39	ϑ [°C]	$\Delta\tau$ [min]	\bar{v}_z [mm/s]	$\bar{C}a$ [1]	t_{eq} [s]	θ_M [°]	CAH [°]	aH [mN/m]	${}^a\bar{E}$ [mN/m]	$\pm\sigma$ [mN/m]	\bar{S} [m/m ²]	$\bar{B}_{\%Isookta...}$ [%]
1.	22717 ₀	20	**0**	»0,0469«	-	3,23	<0>	<0>	-0,003	19,318	±0,020	0,568	103,0%
2.	22718 ₁	20,004	+23,7	10,0	2,65E-4	5,2	<22>	<-44>	12,01	19,43	±0,21	0,680	103,6%
3.	22719 ₂	20,004	+24,7	5,00	1,32E-4	5,4	<27>	<-54>	17,075	19,70	±0,10	0,950	105,1%
4.	22720 ₃	20,009	+25,7	2,50	6,61E-5	6,1	<18>	<-35>	8,577	19,573	±0,057	0,823	104,4%
5.	22721 ₄	20,015	+27,0	1,25	3,31E-5	5,3	<11>	<-22>	4,272	19,493	±0,026	0,743	104,0%
6.	22722 ₅	20,023	+28,5	0,625	1,65E-5	6,5	<6>	<-11>	2,046	19,427	±0,021	0,677	103,6%
7.	22723 ₆	20,008	+30,6	0,313	8,27E-6	6,1	<0>	<0>	1,046	19,401	±0,016	0,651	103,5%
8.	22724 ₇	20,009	+33,9	0,156	4,13E-6	6,4	<0>	<0>	0,553	19,381	±0,015	0,631	103,4%
9.	22725 ₈	20,003	+39,4	<0,957>	2,53E-5	5,0	<7>	<-14>	3,289	19,863	±0,027	1,11	105,9%
10.	22726 ₉	20,007	+41,0	<0,710>	1,87E-5	0,1	<8>	<-16>	3,301	19,659	±0,031	0,909	104,8%
11.	22727 ₁₀	20,006	+42,8	<0,318>	8,43E-6	0,1	<1>	<-2>	1,618	19,668	±0,063	0,918	104,9%
12.	22728 ₁₁	20,003	+45,9	<0,357>*	9,42E-6	0,2	<0>	<0>	2,021	19,909	±0,023	1,16	106,2%
13.	22729 ₁₂	20	+49,0	<0,422>*	1,14E-5	0,2	<3>	<-6>	2,154	19,692	±0,028	0,942	105,0%
14.	22730 ₁₃	20,003	+51,6	<0,392>*	1,04E-5	0,1	<2>	<-4>	1,911	19,646	±0,030	0,896	104,8%
15.	22731 ₁₄	20,004	+54,3	<1,69>*	4,46E-5	0,0	<18>	<-36>	5,198	17,758	±0,088	-0,992	94,7%
16.	22732 ₁₅	20,004	+55,6	<1,93>*	5,10E-5	0,0	<20>	<-40>	9,843	19,36	±0,12	0,610	103,2%
17.	22733 ₁₆	20,002	+56,8	<2,55>*	6,74E-5	0,0	<23>	<-47>	7,822	16,690	±0,094	-2,06	89,0%
18.	22734 ₁₇	20,002	+58,0	<4,43>*	1,17E-4	0,1	<12>	<-23>	6,456	20,44	±0,10	1,69	109,0%
19.	22735 ₁₈	20,003	+59,0	<6,70>*	1,77E-4	5,0	<32>	<-63>	26,4	21,5	±4,2	2,75	114,6%
20.	22736 ₁₉	20	+59,9	»0,0490«	-	3,04	<0>	<0>	-0,296	19,791	±0,014	1,04	105,6%
21.	22737 ₂₀	20	+76,1	»0,0491«	-	3,09	<0>	<0>	-0,010	19,346	±0,019	0,596	103,2%

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 (aH), ${}^a\bar{E}$ 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 ($B_{\%lqsl|md...} = 100\% \cdot {}^aE/\gamma$).

 Tabelle 2.2: Summary of sample weights in the individual measurements (initial weight $W_0 = 6,6497$ g)

N°	W_A [g]	ΔW_{A-0} [mg]	W_E [g]	ΔW_{E-0} [mg]	V_{E-0} [µL]	ΔV_{E-A} [µL]
1.	6,6497	0,0	6,6503	0,6	0,9	0,87
2.	6,6502	0,5	6,6565	6,8	9,8	9,0
3.	6,6563	6,6	6,6542	4,5	6,5	-3,3
4.	6,6541	4,4	6,6528	3,1	4,5	-2,0
5.	6,6526	2,9	6,6517	2,0	2,9	-1,6
6.	6,6516	1,9	6,6510	1,3	1,9	-1,0
7.	6,6509	1,2	6,6506	0,9	1,3	-0,58
8.	6,6507	1,0	6,6505	0,8	1,2	-0,14
9.	6,6505	0,8	6,6515	1,8	2,6	1,4
10.	6,6514	1,7	6,6515	1,8	2,6	~0
11.	6,6513	1,6	6,6509	1,2	1,7	-0,87
12.	6,6509	1,2	6,6508	1,1	1,6	-0,14
13.	6,6507	1,0	6,6513	1,6	2,3	0,72
14.	6,6511	1,4	6,6512	1,5	2,2	-0,14
15.	6,6512	1,5	6,6530	3,3	4,8	2,6
16.	6,6527	3,0	6,6532	3,5	5,1	0,29
17.	6,6530	3,3	6,6539	4,2	6,1	1,0
18.	6,6537	4,0	6,6556	5,9	8,5	2,5
19.	6,6553	5,6	6,6564	6,7	9,7	1,2
20.	6,6563	6,6	6,6506	0,9	1,3	-8,4
21.	6,6506	0,9	6,6516	1,9	2,7	1,4

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°22717: Static Contact CAH =====

Kupfer, cubic plate 25,5×0,6835mm

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

 $\vartheta = 20,0^\circ$

Contact Angle, CA θ_c	$<0 \pm 0^\circ>$	- superwetting -	
Contact Angle Hysteresis, CAH _s	$<0^\circ>$		
	Advancing $\theta_{A,s}$	Receding $\theta_{R,s}$	Transition - mm
Contact Angles, θ_s	0°	0°	$0^\circ_{adv.} \Rightarrow 0^\circ_{rec.}$
Rated measurements $n_{mm-range}$	81 4,000 - 20,001mm	98 20,001 - 3,000mm	2 20,001 - 19,951mm
avg. Triple line speed \bar{v}_z [mm/s]	0,0489 ±0,0855	-0,0449 ±0,545	
avg. Step distance $\bar{\Delta}h_0$ [mm]	0,200 ±9,95E-05	-0,178 ±0,0536	
avg. equilibration Time \bar{t}_{eq} [s]	3,23 ±0,761	3,22 ±0,776	

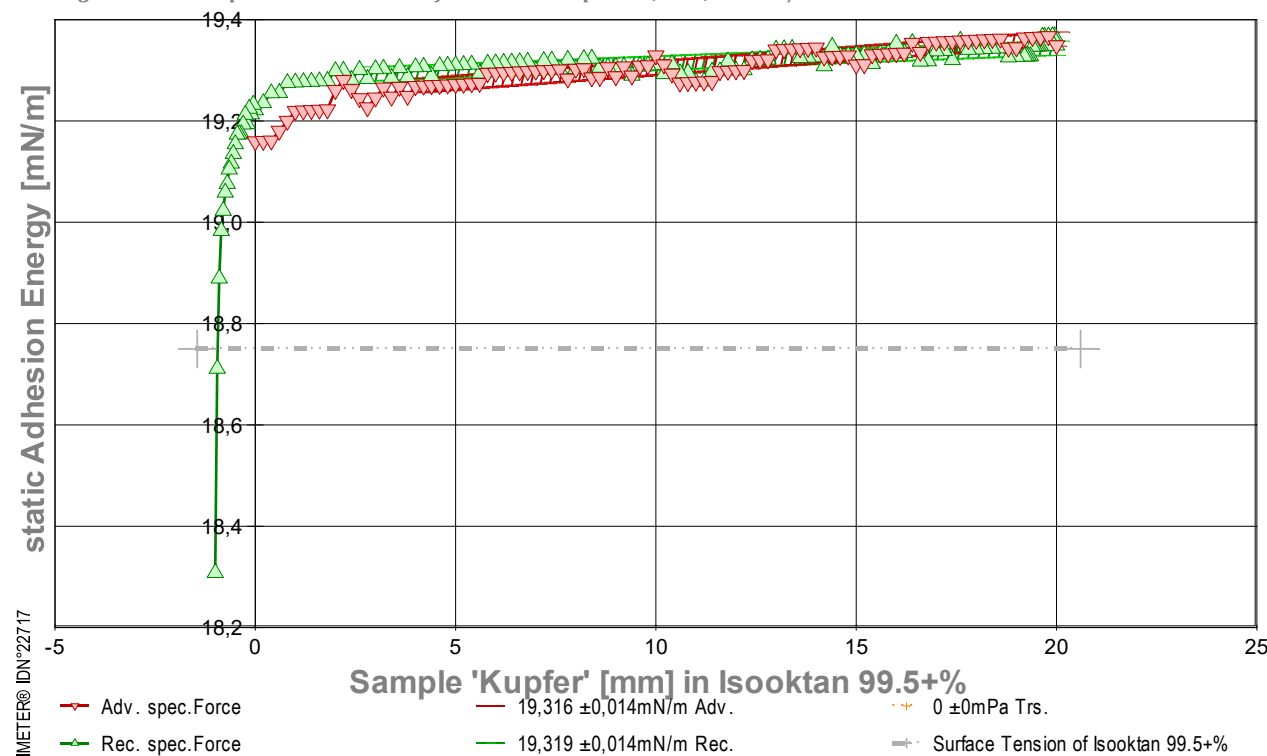
Static Contact Angle Measurement: For superwetting - consider adhesion parameters for analysis. The avg. equilibration Time t_{eq} is the mean of the time between positioning and acquiring the wetting force. The criterion of force equilibrium is defined in the utilized IMPro.

Adhesion Force of the equilibrated Triple Line

Energy of Adhesion, ${}^a\bar{E}_s = ({}^aE_A + {}^aE_R) / 2$	19,318 ±0,020 mN/m		
Hysteresis, ${}^aH_s = {}^aE_A - {}^aE_R$	-0,003 mN/m		
Parameter of spreading, $\bar{S}_s = {}^a\bar{E} - \gamma$	0,568 mJ/m ²		
relative wettability, $\bar{B}_{\%s} = 100 \cdot {}^a\bar{E} / \gamma$	103,0% with Isooktan 99.5+%		
	Advancing ${}^aE_{A,s}$	Receding ${}^aE_{R,s}$	Transition - mm
Energy of Adhesion, aE_s [mN/m]	19,316	19,319	19,368 _{<adv.>} ⇒ 19,367 _{rec.}
Standard deviation ${}^a\sigma$ [mN/m]	±0,014	±0,014	±0
Linear regression, slope [mPa]	0,006	0,003	0
correlation coefficient r^2	0,80	0,58	1,0
Relative wettability, $B_{\%s}$	103,0%	103,0%	

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, $\bar{v}_z = 0,047$ 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. Doch, die Adhäsionsenergie zwischen Isooktan 99.5+% und Kupfer übersteigt die Oberflächenspannung. Diese Überbenetzung (Superwetting) ist gekennzeichnet durch die Kontaktwinkelproblematik, da formal $\cos(\theta) > 1$ vorliegt. Wenn andere Störeinflüsse (ggf. elektrostatische, rheologische) auszuschließen sind, kommen Grenzschicht- und/oder tribologische Effekte in Betracht, die den lokalen Wert der Oberflächenspannung raumgreifend - oder den Wert einer ungeklärten Zusatzkraft an der Triple Line - erhöhen und das Geschehen modifizieren könnten.

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

Sample: 'Kupfer', **Form:** cubic plate, face dimension 25,5 x 0,6835 mm.

Test Liquid: 'Isooktan 99.5+%' at 20°C: density 0,691908 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 3,9 min in the measuring cell above the surface of the liquid.

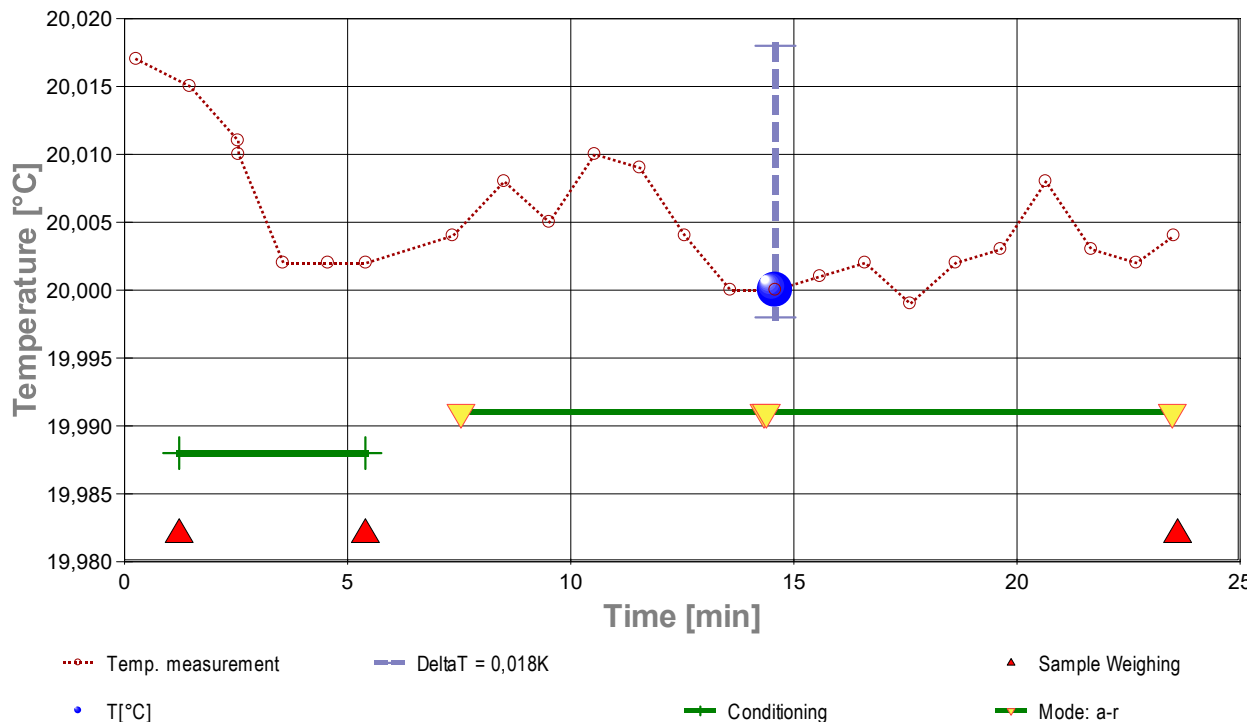
Sample Weight: at start 6,6497 g, after conditioning 6,6497 g, after the measurement 6,6503 g.

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 3,5 s. Duration for immersion 6,8 min, for emersion 1,6 min.

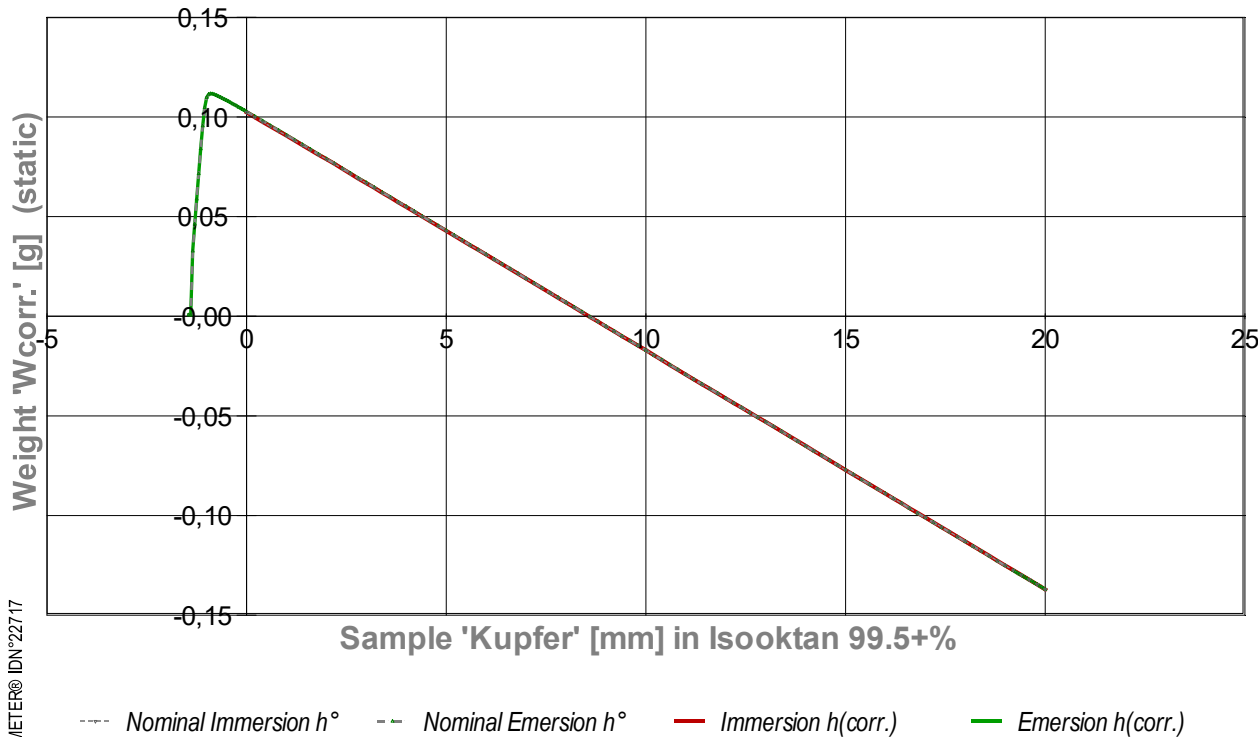
Time & Temperature: 20 Minuten; Temperaturverlauf blieb im gesamten Zeitraum ungefähr isotherm bei 20°C. - *Diagramm 2.4:*

'Temperature & Events²' -- Survey on Temperature and Time



- Das Diagramm "Temperature & Events²" 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: 'RawData²' -- Acquired weights during immersion and emersion (raw data and immersion corrected lengths)*



- Im Diagramm "RawData²" 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 austauschendes 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 run ($n=234$). - 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 final total weight of the sample, sample holder, wetting force and buoyancy is printed. 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 $W_0 = 6,6497$ g).

Tabelle 3.5: Data table

N°	t [min]	t _{eq.} [sec]	h ₀ [mm]	h _{corr.} [mm]	W _{RAW} [g]	W _{corr.} [g]	^a F [mN]	^a E _{A,R} [mN/m]	θ [°deg]	chr --
1.	0,00	2,7	0,000	0,000	6,7520	0,1023	1,0033	19,16	0	a
2.	0,06	2,6	0,200	0,200	6,7496	0,0999	1,0034	19,16	0	a
3.	0,12	2,9	0,400	0,400	6,7472	0,0975	1,0034	19,16	0	a
4.	0,18	2,9	0,600	0,600	6,7449	0,0952	1,0044	19,18	0	a
5.	0,24	4,8	0,800	0,800	6,7426	0,0929	1,0054	19,20	0	a
6.	0,34	3,0	1,000	1,000	6,7403	0,0906	1,0065	19,22	0	a
7.	0,40	3,0	1,200	1,200	6,7379	0,0882	1,0065	19,22	0	a
8.	0,46	2,9	1,400	1,400	6,7355	0,0858	1,0065	19,22	0	a
9.	0,53	2,6	1,600	1,600	6,7331	0,0834	1,0066	19,22	0	a
10.	0,58	5,3	1,800	1,800	6,7307	0,0810	1,0066	19,22	0	a
11.	0,69	2,5	2,000	2,000	6,7285	0,0788	1,0086	19,26	0	a
12.	0,74	2,6	2,200	2,200	6,7262	0,0765	1,0097	19,28	0	a
13.	0,80	3,0	2,400	2,400	6,7237	0,0740	1,0087	19,26	0	a
14.	0,86	3,0	2,600	2,600	6,7212	0,0715	1,0078	19,24	0	a
15.	0,93	2,6	2,800	2,800	6,7187	0,0690	1,0068	19,23	0	a
16.	0,98	3,5	3,000	3,000	6,7164	0,0667	1,0079	19,25	0	a
17.	1,06	3,9	3,200	3,200	6,7141	0,0644	1,0089	19,27	0	a
18.	1,14	2,5	3,400	3,400	6,7116	0,0619	1,0079	19,25	0	a
19.	1,19	3,0	3,600	3,600	6,7093	0,0596	1,0090	19,27	0	a
20.	1,25	2,9	3,800	3,800	6,7068	0,0571	1,0080	19,25	0	a
21.	1,32	2,9	4,000	4,000	6,7045	0,0548	1,0090	19,27	0	a
22.	1,38	3,0	4,200	4,200	6,7021	0,0524	1,0091	19,27	0	a
23.	1,44	3,0	4,400	4,400	6,6997	0,0500	1,0091	19,27	0	a
24.	1,51	3,5	4,600	4,600	6,6973	0,0476	1,0092	19,27	0	a
25.	1,58	3,0	4,800	4,800	6,6949	0,0452	1,0092	19,27	0	a
26.	1,64	3,0	5,000	5,000	6,6925	0,0428	1,0092	19,27	0	a
27.	1,71	3,0	5,200	5,200	6,6901	0,0404	1,0093	19,27	0	a
28.	1,77	3,0	5,400	5,400	6,6877	0,0380	1,0093	19,27	0	a
29.	1,83	2,9	5,600	5,600	6,6853	0,0356	1,0094	19,27	0	a
30.	1,89	2,6	5,800	5,800	6,6830	0,0333	1,0104	19,29	0	a
31.	1,95	3,0	6,000	6,000	6,6806	0,0309	1,0104	19,29	0	a
32.	2,01	3,5	6,200	6,200	6,6782	0,0285	1,0105	19,30	0	a
33.	2,09	3,0	6,400	6,400	6,6758	0,0261	1,0105	19,30	0	a
34.	2,15	3,0	6,600	6,600	6,6734	0,0237	1,0105	19,30	0	a
35.	2,21	2,6	6,800	6,800	6,6710	0,0213	1,0106	19,30	0	a
36.	2,27	3,4	7,000	7,000	6,6686	0,0189	1,0106	19,30	0	a
37.	2,34	2,9	7,200	7,200	6,6662	0,0165	1,0107	19,30	0	a
38.	2,40	3,0	7,400	7,400	6,6638	0,0141	1,0107	19,30	0	a
39.	2,47	5,8	7,600	7,600	6,6614	0,0117	1,0107	19,30	0	a
40.	2,58	3,0	7,800	7,800	6,6589	0,0092	1,0098	19,28	0	a
41.	2,64	3,0	8,000	8,000	6,6566	0,0069	1,0108	19,30	0	a
42.	2,71	4,8	8,200	8,200	6,6542	0,0045	1,0109	19,30	0	a
43.	2,80	4,8	8,400	8,400	6,6517	0,0020	1,0099	19,29	0	a
44.	2,90	3,0	8,600	8,600	6,6493	-0,0004	1,0100	19,29	0	a
45.	2,96	5,3	8,800	8,800	6,6470	-0,0027	1,0110	19,31	0	a
46.	3,06	3,0	9,000	9,000	6,6445	-0,0052	1,0100	19,29	0	a
47.	3,13	2,5	9,200	9,200	6,6422	-0,0075	1,0111	19,31	0	a
48.	3,18	2,9	9,400	9,400	6,6397	-0,0100	1,0101	19,29	0	a
49.	3,25	3,0	9,600	9,600	6,6374	-0,0123	1,0111	19,31	0	a
50.	3,31	2,9	9,800	9,800	6,6350	-0,0147	1,0112	19,31	0	a
51.	3,37	3,0	10,000	10,000	6,6327	-0,0170	1,0122	19,33	0	a
52.	3,44	6,3	10,200	10,200	6,6302	-0,0195	1,0113	19,31	0	a
53.	3,56	2,5	10,400	10,400	6,6277	-0,0220	1,0103	19,29	0	a
54.	3,61	2,9	10,600	10,600	6,6252	-0,0245	1,0094	19,28	0	a
55.	3,67	3,0	10,800	10,800	6,6228	-0,0269	1,0094	19,28	0	a
56.	3,74	2,9	11,000	11,000	6,6204	-0,0293	1,0095	19,28	0	a
57.	3,80	2,9	11,200	11,200	6,6180	-0,0317	1,0095	19,28	0	a
58.	3,86	4,4	11,400	11,400	6,6156	-0,0341	1,0096	19,28	0	a
59.	3,95	2,9	11,600	11,600	6,6133	-0,0364	1,0106	19,30	0	a
60.	4,01	3,4	11,800	11,800	6,6109	-0,0388	1,0106	19,30	0	a
61.	4,08	3,0	12,000	12,000	6,6085	-0,0412	1,0107	19,30	0	a
62.	4,15	3,0	12,200	12,200	6,6061	-0,0436	1,0107	19,30	0	a
63.	4,21	2,9	12,400	12,400	6,6038	-0,0459	1,0117	19,32	0	a
64.	4,27	2,9	12,600	12,600	6,6014	-0,0483	1,0118	19,32	0	a
65.	4,33	3,0	12,800	12,800	6,5990	-0,0507	1,0118	19,32	0	a
66.	4,40	3,5	13,000	13,000	6,5967	-0,0530	1,0128	19,34	0	a
67.	4,47	3,0	13,200	13,200	6,5943	-0,0554	1,0129	19,34	0	a
68.	4,53	3,5	13,400	13,400	6,5919	-0,0578	1,0129	19,34	0	a
69.	4,61	3,0	13,600	13,600	6,5895	-0,0602	1,0129	19,34	0	a
70.	4,67	2,9	13,800	13,800	6,5871	-0,0626	1,0130	19,34	0	a
71.	4,74	3,0	14,000	14,000	6,5847	-0,0650	1,0130	19,34	0	a
72.	4,80	2,9	14,200	14,200	6,5822	-0,0675	1,0121	19,33	0	a
73.	4,86	2,9	14,400	14,400	6,5798	-0,0699	1,0121	19,33	0	a
74.	4,92	3,0	14,600	14,600	6,5774	-0,0723	1,0122	19,33	0	a
75.	4,99	3,0	14,800	14,800	6,5750	-0,0747	1,0122	19,33	0	a
76.	5,05	3,6	15,000	15,000	6,5725	-0,0772	1,0113	19,31	0	a
77.	5,13	2,5	15,200	15,200	6,5701	-0,0796	1,0113	19,31	0	a
78.	5,18	3,0	15,400	15,400	6,5678	-0,0819	1,0123	19,33	0	a
79.	5,25	3,0	15,600	15,600	6,5654	-0,0843	1,0124	19,33	0	a
80.	5,31	5,8	15,800	15,800	6,5630	-0,0867	1,0124	19,33	0	a
81.	5,42	2,9	16,000	16,000	6,5606	-0,0891	1,0124	19,33	0	a
82.	5,48	3,0	16,200	16,200	6,5582	-0,0915	1,0125	19,33	0	a
83.	5,55	3,4	16,400	16,400	6,5559	-0,0938	1,0135	19,35	0	a
84.	5,62	2,9	16,600	16,600	6,5534	-0,0963	1,0126	19,34	0	a
85.	5,68	2,9	16,800	16,800	6,5511	-0,0986	1,0136	19,36	0	a
86.	5,75	3,0	17,000	17,000	6,5487	-0,1010	1,0136	19,36	0	a
87.	5,81	3,0	17,200	17,200	6,5463	-0,1034	1,0137	19,36	0	a
88.	5,87	3,0	17,400	17,400	6,5439	-0,1058	1,0137	19,36	0	a
89.	5,94	3,0	17,600	17,600	6,5415	-0,1082	1,0137	19,36	0	a

90.	6.00	5,6	17,800	17,800	6,5391	-0,1106	1,0138	19,36	0	a
91.	6,11	3,0	18,000	18,000	6,5367	-0,1130	1,0138	19,36	0	a
92.	6,17	3,0	18,200	18,200	6,5343	-0,1154	1,0139	19,36	0	a
93.	6,24	3,0	18,400	18,400	6,5319	-0,1178	1,0139	19,36	0	a
94.	6,30	3,9	18,600	18,600	6,5295	-0,1202	1,0139	19,36	0	a
95.	6,38	2,9	18,800	18,800	6,5270	-0,1227	1,0130	19,34	0	a
96.	6,44	2,9	19,000	19,000	6,5246	-0,1251	1,0130	19,35	0	a
97.	6,50	3,5	19,200	19,200	6,5223	-0,1274	1,0141	19,36	0	a
98.	6,57	3,0	19,400	19,400	6,5199	-0,1298	1,0141	19,37	0	a
99.	6,64	3,0	19,600	19,600	6,5175	-0,1322	1,0141	19,37	0	a
100.	6,70	4,4	19,801	19,801	6,5151	-0,1346	1,0142	19,37	0	a
101.	6,79	3,0	20,001	20,001	6,5126	-0,1371	1,0133	19,35	0	a
102.	6,85	2,5	19,951	19,951	6,5133	-0,1364	1,0142	19,37	0	r
103.	6,90	3,0	19,901	19,901	6,5139	-0,1358	1,0142	19,37	0	r
104.	6,96	2,5	19,851	19,851	6,5144	-0,1353	1,0132	19,35	0	r
105.	7,01	3,0	19,801	19,801	6,5151	-0,1346	1,0142	19,37	0	r
106.	7,07	3,1	19,751	19,751	6,5156	-0,1341	1,0132	19,35	0	r
107.	7,13	2,9	19,701	19,701	6,5163	-0,1334	1,0142	19,37	0	r
108.	7,19	3,1	19,651	19,651	6,5169	-0,1328	1,0142	19,37	0	r
109.	7,25	3,4	19,601	19,601	6,5174	-0,1323	1,0132	19,35	0	r
110.	7,32	3,0	19,551	19,551	6,5180	-0,1317	1,0132	19,35	0	r
111.	7,38	2,5	19,501	19,501	6,5186	-0,1311	1,0132	19,35	0	r
112.	7,43	4,9	19,451	19,451	6,5192	-0,1305	1,0131	19,35	0	r
113.	7,52	2,5	19,401	19,401	6,5198	-0,1299	1,0131	19,35	0	r
114.	7,57	3,5	19,351	19,351	6,5203	-0,1294	1,0121	19,33	0	r
115.	7,64	2,6	19,301	19,301	6,5209	-0,1288	1,0121	19,33	0	r
116.	7,69	3,9	19,251	19,251	6,5215	-0,1282	1,0121	19,33	0	r
117.	7,77	3,5	19,201	19,201	6,5221	-0,1276	1,0121	19,33	0	r
118.	7,84	5,0	19,001	19,001	6,5245	-0,1252	1,0121	19,33	0	r
119.	7,94	3,9	18,801	18,801	6,5269	-0,1228	1,0120	19,33	0	r
120.	8,01	4,0	18,601	18,601	6,5294	-0,1203	1,0130	19,34	0	r
121.	8,09	4,4	18,401	18,401	6,5318	-0,1179	1,0129	19,34	0	r
122.	8,18	3,0	18,201	18,201	6,5342	-0,1155	1,0129	19,34	0	r
123.	8,24	2,6	18,001	18,001	6,5366	-0,1131	1,0129	19,34	0	r
124.	8,30	4,0	17,801	17,801	6,5390	-0,1107	1,0128	19,34	0	r
125.	8,38	3,0	17,601	17,601	6,5415	-0,1082	1,0138	19,36	0	r
126.	8,45	2,5	17,401	17,401	6,5437	-0,1060	1,0118	19,32	0	r
127.	8,50	3,0	17,201	17,201	6,5462	-0,1035	1,0127	19,34	0	r
128.	8,57	2,6	17,001	17,001	6,5486	-0,1011	1,0127	19,34	0	r
129.	8,62	2,6	16,801	16,801	6,5509	-0,0988	1,0116	19,32	0	r
130.	8,68	3,0	16,601	16,601	6,5533	-0,0964	1,0116	19,32	0	r
131.	8,75	4,8	16,401	16,401	6,5559	-0,0938	1,0135	19,35	0	r
132.	8,84	3,0	16,201	16,201	6,5582	-0,0915	1,0125	19,33	0	r
133.	8,91	3,0	16,001	16,001	6,5607	-0,0890	1,0134	19,35	0	r
134.	8,97	4,0	15,801	15,801	6,5630	-0,0867	1,0124	19,33	0	r
135.	9,05	3,0	15,601	15,601	6,5654	-0,0843	1,0124	19,33	0	r
136.	9,13	2,7	15,401	15,401	6,5677	-0,0820	1,0114	19,31	0	r
137.	9,18	3,0	15,201	15,201	6,5702	-0,0795	1,0123	19,33	0	r
138.	9,25	3,0	15,001	15,001	6,5726	-0,0771	1,0123	19,33	0	r
139.	9,31	3,0	14,801	14,801	6,5750	-0,0747	1,0122	19,33	0	r
140.	9,38	3,0	14,601	14,601	6,5774	-0,0723	1,0122	19,33	0	r
141.	9,44	3,9	14,401	14,401	6,5799	-0,0698	1,0131	19,35	0	r
142.	9,52	3,4	14,201	14,201	6,5821	-0,0676	1,0111	19,31	0	r
143.	9,59	3,5	14,000	14,000	6,5846	-0,0651	1,0120	19,33	0	r
144.	9,66	4,4	13,800	13,800	6,5870	-0,0627	1,0120	19,33	0	r
145.	9,75	3,0	13,600	13,600	6,5894	-0,0603	1,0120	19,32	0	r
146.	9,82	3,5	13,400	13,400	6,5919	-0,0578	1,0129	19,34	0	r
147.	9,89	3,0	13,200	13,200	6,5943	-0,0554	1,0129	19,34	0	r
148.	9,95	4,0	13,000	13,000	6,5967	-0,0530	1,0128	19,34	0	r
149.	10,04	3,0	12,800	12,800	6,5990	-0,0507	1,0118	19,32	0	r
150.	10,10	3,1	12,600	12,600	6,6014	-0,0483	1,0118	19,32	0	r
151.	10,16	2,5	12,400	12,400	6,6038	-0,0459	1,0117	19,32	0	r
152.	10,22	6,8	12,200	12,200	6,6061	-0,0436	1,0107	19,30	0	r
153.	10,35	2,5	12,000	12,000	6,6085	-0,0412	1,0107	19,30	0	r
154.	10,40	3,5	11,800	11,800	6,6110	-0,0387	1,0116	19,32	0	r
155.	10,48	4,0	11,600	11,600	6,6133	-0,0364	1,0106	19,30	0	r
156.	10,56	5,3	11,400	11,400	6,6157	-0,0340	1,0105	19,30	0	r
157.	10,66	2,5	11,200	11,200	6,6180	-0,0317	1,0095	19,28	0	r
158.	10,72	3,0	11,000	11,000	6,6204	-0,0293	1,0095	19,28	0	r
159.	10,78	3,5	10,800	10,800	6,6229	-0,0268	1,0104	19,30	0	r
160.	10,85	3,0	10,600	10,600	6,6253	-0,0244	1,0104	19,29	0	r
161.	10,92	3,0	10,400	10,400	6,6278	-0,0219	1,0113	19,31	0	r
162.	10,98	5,3	10,200	10,200	6,6301	-0,0196	1,0103	19,29	0	r
163.	11,08	2,5	10,000	10,000	6,6326	-0,0171	1,0112	19,31	0	r
164.	11,16	4,9	9,800	9,800	6,6350	-0,0147	1,0112	19,31	0	r
165.	11,25	3,0	9,600	9,600	6,6374	-0,0123	1,0112	19,31	0	r
166.	11,32	3,0	9,400	9,400	6,6397	-0,0100	1,0101	19,29	0	r
167.	11,38	3,0	9,200	9,200	6,6422	-0,0075	1,0111	19,31	0	r
168.	11,44	4,9	9,000	9,000	6,6446	-0,0051	1,0110	19,31	0	r
169.	11,54	2,5	8,800	8,800	6,6470	-0,0027	1,0110	19,31	0	r
170.	11,60	3,5	8,600	8,600	6,6494	-0,0003	1,0110	19,31	0	r
171.	11,67	3,9	8,400	8,400	6,6519	0,0022	1,0119	19,32	0	r
172.	11,75	2,5	8,200	8,200	6,6543	0,0046	1,0119	19,32	0	r
173.	11,81	2,9	8,000	8,000	6,6566	0,0069	1,0108	19,30	0	r
174.	11,87	2,7	7,800	7,800	6,6591	0,0094	1,0118	19,32	0	r
175.	11,93	3,0	7,600	7,600	6,6614	0,0117	1,0108	19,30	0	r
176.	11,99	3,0	7,400	7,400	6,6639	0,0142	1,0117	19,32	0	r
177.	12,06	2,5	7,200	7,200	6,6663	0,0166	1,0117	19,32	0	r
178.	12,11	3,6	7,000	7,000	6,6686	0,0189	1,0106	19,30	0	r
179.	12,19	2,5	6,800	6,800	6,6711	0,0214	1,0116	19,32	0	r
180.	12,24	3,5	6,600	6,600	6,6735	0,0238	1,0115	19,32	0	r
181.	12,32	3,0	6,400	6,400	6,6759	0,0262	1,0115	19,32	0	r
182.	12,38	3,5	6,200	6,200	6,6783	0,0286	1,0115	19,31	0	r
183.	12,45	2,6	6,000	6,000	6,6807	0,0310	1,0114	19,31	0	r
184.	12,51	3,0	5,800	5,800	6,6831	0,0334	1,0114	19,31	0	r
185.	12,57	3,0	5,600	5,600	6,6854	0,0357	1,0104	19,29	0	r
186.	12,64	2,6	5,400	5,400	6,6879	0,0382	1,0113	19,31	0	r
187.	12,70	2,6	5,200	5,200	6,6903	0,0406	1,0113	19,31	0	r
188.	12,75	3,9	5,000	5,000	6,6927	0,0430	1,0112	19,31	0	r
189.	12,83	2,9	4,800	4,800	6,6951	0,0454	1,0112	19,31	0	r
190.	12,90	2,6	4,600	4,600	6,6975	0,0478	1,0111	19,31	0	r
191.	12,95	3,4	4,400	4,400	6,6998	0,0501	1,0101	19,29	0	r
192.	13,03	2,9	4,200	4,200	6,7023	0,0526	1,0111	19,31	0	r

193.	13,09	2,5	4,000	4,000	6,7043	0,0550	1,0110	19,31	0	r
194.	13,14	5,1	3,800	3,800	6,7070	0,0573	1,0100	19,29	0	r
195.	13,24	3,0	3,600	3,600	6,7095	0,0598	1,0109	19,30	0	r
196.	13,31	3,0	3,400	3,400	6,7118	0,0621	1,0099	19,29	0	r
197.	13,37	3,5	3,200	3,200	6,7143	0,0646	1,0109	19,30	0	r
198.	13,44	2,9	3,000	3,000	6,7167	0,0670	1,0108	19,30	0	r
199.	13,51	3,0	2,800	2,800	6,7190	0,0693	1,0098	19,28	0	r
200.	13,57	3,0	2,600	2,600	6,7215	0,0718	1,0107	19,30	0	r
201.	13,63	3,0	2,400	2,400	6,7238	0,0741	1,0097	19,28	0	r
202.	13,70	2,6	2,200	2,200	6,7263	0,0766	1,0107	19,30	0	r
203.	13,76	3,1	2,000	2,000	6,7287	0,0790	1,0106	19,30	0	r
204.	13,82	2,5	1,800	1,800	6,7310	0,0813	1,0096	19,28	0	r
205.	13,88	3,5	1,600	1,600	6,7334	0,0837	1,0096	19,28	0	r
206.	13,95	3,0	1,400	1,400	6,7358	0,0861	1,0095	19,28	0	r
207.	14,01	2,6	1,200	1,200	6,7382	0,0885	1,0095	19,28	0	r
208.	14,07	2,6	1,000	1,000	6,7406	0,0909	1,0094	19,28	0	r
209.	14,13	3,7	0,800	0,800	6,7430	0,0933	1,0094	19,28	0	r
210.	14,20	2,5	0,600	0,600	6,7453	0,0956	1,0084	19,26	0	r
211.	14,26	3,0	0,400	0,400	6,7477	0,0980	1,0083	19,25	0	r
212.	14,32	2,5	0,200	0,200	6,7500	0,1003	1,0073	19,24	0	r
213.	14,38	1,6	0,000	0,000	6,7523	0,1026	1,0066	19,22	0	r
214.	14,42	1,7	-0,050	-0,050	6,7530	0,1033	1,0071	19,23	0	cb
215.	14,46	1,6	-0,100	-0,100	6,7535	0,1038	1,0061	19,21	0	cb
216.	14,50	3,7	-0,150	-0,150	6,7542	0,1044	1,0067	19,22	0	cb
217.	14,58	1,5	-0,200	-0,200	6,7546	0,1049	1,0051	19,19	0	cb
218.	14,61	1,6	-0,250	-0,250	6,7553	0,1056	1,0061	19,21	0	cb
219.	14,65	1,6	-0,300	-0,300	6,7558	0,1061	1,0051	19,19	0	cb
220.	14,70	1,6	-0,350	-0,350	6,7563	0,1066	1,0041	19,17	0	cb
221.	14,74	1,7	-0,400	-0,400	6,7569	0,1072	1,0041	19,17	0	cb
222.	14,78	1,6	-0,450	-0,450	6,7575	0,1078	1,0041	19,17	0	cb
223.	14,82	1,6	-0,500	-0,500	6,7580	0,1083	1,0031	19,15	0	cb
224.	14,86	1,6	-0,550	-0,550	6,7585	0,1088	1,0021	19,14	0	cb
225.	14,90	1,6	-0,600	-0,600	6,7590	0,1093	1,0011	19,12	0	cb
226.	14,94	1,6	-0,650	-0,650	6,7595	0,1098	1,0004	19,10	0	cb
227.	14,98	2,1	-0,700	-0,700	6,7600	0,1103	0,9990	19,08	0	cb
228.	15,03	1,6	-0,750	-0,750	6,7605	0,1108	0,9981	19,06	0	cb
229.	15,07	1,5	-0,800	-0,800	6,7609	0,1112	0,9962	19,02	0	cb
230.	15,11	3,6	-0,850	-0,850	6,7613	0,1116	0,9941	18,98	0	cb
231.	15,20	1,5	-0,900	-0,900	6,7614	0,1117	0,9892	18,89	0	cb
232.	15,24	1,5	-0,950	-0,950	6,7610	0,1113	0,9798	18,71	3,69	cb
233.	15,28	3,7	-1,000	-1,000	6,7595	0,1098	0,9587	18,31	12,46	cb
234.	15,36	3,6	-1,050	-1,050	6,7544	0,1047	0,9028	-	23,15	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, 24.05.23, 104997", type 4/4. Time Period of the Accomplishment: Mai., 24. 2023 between 20:07:06 and 20:30:47, elapsed time: 20 minutes. IMPro finished as projected. The complete Report first was presented on Mai., 24.23 at 23:42. Original data was changed as reported to Audit-Log:

Start of this IMPro 20:14:35, - 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 0rpm. 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.v7,43=150µL,

Measurement: CLT STATIC, PumpN°1 [n], Vol. 2,50 [cm³], FüllVolumen 0,5 [cm³], FreiVolumen 2 [cm³], VolBilanz 0,3504, PFlussRate 8,73µL/s, DichteDerFlüssigkeit 0,691905 [g/cm³].

v7,54=-3,49µL,v7,60=-3,49µL,v7,66=-3,49µL,v7,72=-3,49µL,v7,78=-3,49µL,v7,84=-3,49µL,v7,90=-3,49µL,v8,01=-3,49µL,v8,07=-3,49µL,v8,13=-3,49µL,v8,19=-3,49µL,v8,25=-3,49µL,v8,31=-3,49µL,v8,37=-3,49µL,v8,43=-3,49µL,v8,49=-3,49µL,v8,55=-3,49µL,v8,61=-3,49µL,v8,67=-3,49µL,v8,73=-3,49µL,v8,79=-3,49µL,v8,85=-3,49µL,v8,91=-3,49µL,v8,97=-3,49µL,v9,03=-3,49µL,v9,09=-3,49µL,v9,15=-3,49µL,v9,21=-3,49µL,v9,27=-3,49µL,v9,33=-3,49µL,v9,39=-3,49µL,v9,45=-3,49µL,v9,51=-3,49µL,v9,57=-3,49µL,v9,63=-3,49µL,v9,69=-3,49µL,v9,75=-3,49µL,v9,81=-3,49µL,v9,87=-3,49µL,v9,93=-3,49µL,v9,99=-3,49µL,v10,05=-3,49µL,v10,11=-3,49µL,v10,17=-3,49µL,v10,23=-3,49µL,v10,29=-3,49µL,v10,35=-3,49µL,v10,41=-3,49µL,v10,47=-3,49µL,v10,53=-3,49µL,v10,59=-3,49µL,v10,65=-3,49µL,v10,71=-3,49µL,v10,77=-3,49µL,v10,83=-3,49µL,v10,89=-3,49µL,v10,95=-3,49µL,v11,01=-3,49µL,v11,07=-3,49µL,v11,13=-3,49µL,v11,19=-3,49µL,v11,25=-3,49µL,v11,31=-3,49µL,v11,37=-3,49µL,v11,43=-3,49µL,v11,49=-3,49µL,v11,55=-3,49µL,v11,61=-3,49µL,v11,67=-3,49µL,v11,73=-3,49µL,v11,79=-3,49µL,v11,85=-3,49µL,v11,91=-3,49µL,v11,97=-3,49µL,v12,03=-3,49µL,v12,09=-3,49µL,v12,15=-3,49µL,v12,21=-3,49µL,v12,27=-3,49µL,v12,33=-3,49µL,v12,39=-3,49µL,v12,45=-3,49µL,v12,51=-3,49µL,v12,57=-3,49µL,v12,63=-3,49µL,v12,69=-3,49µL,v12,75=-3,49µL,v12,81=-3,49µL,v12,87=-3,49µL,v12,93=-3,49µL,v12,99=-3,49µL,v13,05=-3,49µL,v13,11=-3,49µL,v13,17=-3,49µL,v13,23=-3,49µL,v13,29=-3,49µL,v13,35=-3,49µL,v13,41=-3,49µL,v13,47=-3,49µL,v13,53=-3,49µL,v13,59=-3,49µL,v13,65=-3,49µL,v13,71=-3,49µL,v13,77=-3,49µL,v13,83=-3,49µL,v13,89=-3,49µL,v13,95=-3,49µL,v14,01=-3,49µL,v14,07=-3,49µL,v14,13=-3,49µL,v14,19=-3,49µL,v14,25=-3,49µL,v14,31=-3,49µL,v14,37=-3,49µL,v14,43=-3,49µL,v14,49=-3,49µL,v14,55=-3,49µL,v14,61=-3,49µL,v14,67=-3,49µL,v14,73=-3,49µL,v14,79=-3,49µL,v14,85=-3,49µL,v14,91=-3,49µL,v14,97=-3,49µL,v15,03=-3,49µL,v15,09=-3,49µL,v15,15=-3,49µL,v15,21=-3,49µL,v15,27=-3,49µL,v15,33=-3,49µL,v15,39=-3,49µL,v15,45=-3,49µL,v15,51=-3,49µL,v15,57=-3,49µL,v15,63=-3,49µL,v15,69=-3,49µL,v15,75=-3,49µL,v15,81=-3,49µL,v15,87=-3,49µL,v15,93=-3,49µL,v15,99=-3,49µL,v16,05=-3,49µL,v16,11=-3,49µL,v16,17=-3,49µL,v16,23=-3,49µL,v16,29=-3,49µL,v16,35=-3,49µL,v16,41=-3,49µL,v16,47=-3,49µL,v16,53=-3,49µL,v16,59=-3,49µL,v16,65=-3,49µL,v16,71=-3,49µL,v16,77=-3,49µL,v16,83=-3,49µL,v16,89=-3,49µL,v16,95=-3,49µL,v17,01=-3,49µL,v17,07=-3,49µL,v17,13=-3,49µL,v17,19=-3,49µL,v17,25=-3,49µL,v17,31=-3,49µL,v17,37=-3,49µL,v17,43=-3,49µL,v17,49=-3,49µL,v17,55=-3,49µL,v17,61=-3,49µL,v17,67=-3,49µL,v17,73=-3,49µL,v17,79=-3,49µL,v17,85=-3,49µL,v17,91=-3,49µL,v17,97=-3,49µL,v18,03=-3,49µL,v18,09=-3,49µL,v18,15=-3,49µL,v18,21=-3,49µL,v18,27=-3,49µL,v18,33=-3,49µL,v18,39=-3,49µL,v18,45=-3,49µL,v18,51=-3,49µL,v18,57=-3,49µL,v18,63=-3,49µL,v18,69=-3,49µL,v18,75=-3,49µL,v18,81=-3,49µL,v18,87=-3,49µL,v18,93=-3,49µL,v18,99=-3,49µL,v19,05=-3,49µL,v19,11=-3,49µL,v19,17=-3,49µL,v19,23=-3,49µL,v19,29=-3,49µL,v19,35=-3,49µL,v19,41=-3,49µL,v19,47=-3,49µL,v19,53=-3,49µL,v19,59=-3,49µL,v19,65=-3,49µL,v19,71=-3,49µL,v19,77=-3,49µL,v19,83=-3,49µL,v19,89=-3,49µL,v19,95=-3,49µL,v20,01=-3,49µL,v20,07=-3,49µL,v20,13=-3,49µL,v20,19=-3,49µL,v20,25=-3,49µL,v20,31=-3,49µL,v20,37=-3,49µL,v20,43=-3,49µL,v20,49=-3,49µL,v20,55=-3,49µL,v20,61=-3,49µL,v20,67=-3,49µL,v20,73=-3,49µL,v20,79=-3,49µL,v20,85=-3,49µL,v20,91=-3,49µL,v20,97=-3,49µL,v21,03=-3,49µL,v21,09=-3,49µL,v21,15=-3,49µL,v21,21=-3,49µL,v21,27=-3,49µL,v21,33=-3,49µL,v21,39=-3,49µL,v21,45=-3,49µL,v21,51=-3,49µL,v21,57=-3,49µL,v21,63=-3,49µL,v21,69=-3,49µL,v21,75=-3,49µL,v21,81=-3,49µL,v21,87=-3,49µL,v21,93=-3,49µL,v21,99=-3,49µL,v22,01=-3,49µL,v22,07=-3,49µL,v22,13=-3,49µL,v22,19=-3,49µL,v22,25=-3,49µL,v22,31=-3,49µL,v22,37=-3,49µL,v22,43=-3,49µL,v22,49=-3,49µL,v22,55=-3,49µL,v22,61=-3,49µL,v22,67=-3,49µL,v22,73=-3,49µL,v22,79=-3,49µL,v22,85=-3,49µL,v22,91=-3,49µL,v22,97=-3,49µL,v23,03=-3,49µL,v23,09=-3,49µL,v23,15=-3,49µL,v23,21=-3,49µL,v23,27=-3,49µL,v23,33=-3,49µL,v23,39=-3,49µL,v23,45=-3,49µL,v23,51=-3,49µL,v23,57=-3,49µL,v23,63=-3,49µL,v23,69=-3,49µL,v23,75=-3,49µL,v23,81=-3,49µL,v23,87=-3,49µL,v23,93=-3,49µL,v23,99=-3,49µL,v24,01=-3,49µL,v24,07=-3,49µL,v24,13=-3,49µL,v24,19=-3,49µL,v24,25=-3,49µL,v24,31=-3,49µL,v24,37=-3,49µL,v24,43=-3,49µL,v24,49=-3,49µL,v24,55=-3,49µL,v24,61=-3,49µL,v24,67=-3,49µL,v24,73=-3,49µL,v24,79=-3,49µL,v24,85=-3,49µL,v24,91=-3,49µL,v24,97=-3,49µL,v25,03=-3,49µL,v25,09=-3,49µL,v25,15=-3,49µL,v25,21=-3,49µL,v25,27=-3,49µL,v25,33=-3,49µL,v25,39=-3,49µL,v25,45=-3,49µL,v25,51=-3,49µL,v25,57=-3,49µL,v25,63=-3,49µL,v25,69=-3,49µL,v25,75=-3,49µL,v25,81=-3,49µL,v25,87=-3,49µL,v25,93=-3,49µL,v25,99=-3,49µL,v26,01=-3,49µL,v26,07=-3,49µL,v26,13=-3,49µL,v26,19=-3,49µL,v26,25=-3,49µL,v26,31=-3,49µL,v26,37=-3,49µL,v26,43=-3,49µL,v26,49=-3,49µL,v26,55=-3,49µL,v26,61=-3,49µL,v26,67=-3,49µL,v26,73=-3,49µL,v26,79=-3,49µL,v26,85=-3,49µL,v26,91=-3,49µL,v26,97=-3,49µL,v27,03=-3,49µL,v27,09=-3,49µL,v27,15=-3,49µL,v27,21=-3,49µL,v27,27=-3,49µL,v27,33=-3,49µL,v27,39=-3,49µL,v27,45=-3,49µL,v27,51=-3,49µL,v27,57=-3,49µL,v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The Number **22717** refers to the Recordset in the Database '**imeterData39**' where all Information can be retrieved at any time.

Prüfmittel

Die Wägeeinheit (WZA224) wurde um 15:00, am Vortag dieser Messung von Augsburg-Lab justiert. Die letzte vollständige Prüfung der Positioniervorrichtung von **IMETER** (ID23903733) erfolgte am 26.08.18. 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: $-0,0054 + 0,997591 \cdot \vartheta + 2,20165E-05 \cdot \vartheta^2 - 4,78431E-08 \cdot \vartheta^3$). Akquisitions-Softwareversion IMETER 7.4.20, LizenzN^o * 3037-4759*, W. 6.2,9200- Betriebssystem auf PC Ser.N^o6995684 (C, SSD).

Meteorologische Angaben, Luftdichte:

Time [min]	ϕ [%]	T_a [°C]	p_a [kPa]	ρ_{air} [kg/m ³]
0,2	43,83	24,31	96,35	1,12279

Obige Zusammenstellung gibt die Aufzeichnung der Atmosphären Daten 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.