Cinética da redução do corante azul de toluidina pelo ião sulfito

Felipe Pinto	61387	MIEQB
Francisco Duarte	63754	LEQB
Lunara Maciel	54768	MIEQB
Sebastião Carvalhal	60823	MIEQB

Conteúdo

1 Cálculos Pré-laboratoriais

TB^+

$$V_{Mae} = \frac{\mathrm{mL_{Mae}}}{2.0 * 10^{-4}\,\mathrm{mol_{TB^+}}} \frac{2.0 * 10^{-5}\,\mathrm{mol_{TB^+}}}{\mathrm{mL_{Sol}}} 20\,\mathrm{mL_{Sol}} = 2.0\,\mathrm{mL_{Mae}}$$

Na_2SO_3

$$V_{Mae} = \frac{\mathrm{mL_{Mae}}}{0.20\,\mathrm{mol_{Na_2SO_3}}} \frac{x\,\mathrm{mol_{Na_2SO_3}}}{\mathrm{mL_{Sol}}} 20\,\mathrm{mL_{Sol}} = 100\,x\,\mathrm{mL_{Mae}}$$

$M_{Na_2SO_3}$	0.02	0.04	0.06	0.08	0.10
mL_{Mae}	2	4	6	8	10

NaCl

$$\boldsymbol{V_{Mae} = \frac{0.48999 - 3\,c_{Na_2SO_3}}{0.03}\,\mathrm{mL_{Mae}}}$$

$$V_{Mae} = \frac{\mathrm{mL_{Mae}}}{0.60\,\mathrm{mol_{NaCl}}} \frac{c_{NaCl}\mathrm{mol_{NaCl}}}{\mathrm{mL_{Sol}}} 20\,\mathrm{mL_{Sol}} = \frac{c_{NaCl}}{0.03}\,\mathrm{mL_{Mae}}$$

$$I = 0.49 = \frac{1}{2}\sum_{i=1}^{n} c_n\,z_n^2 = \frac{1}{2}\begin{pmatrix} 2.0 * 10^{-5} & *(+1)^2+ & (TB^+) \\ +c_{Na_2SO_3} * 2 & *(+1)^2+ & (Na^{2+}) \\ +c_{Na_2SO_3} & *(-2)^2+ & (So^{2-}) \\ +c_{NaCl} & *(+1)^2+ & (Na^{1+}) \\ +c_{NaCl} & *(-1)^2 & (Cl^{1-}) \end{pmatrix} \implies$$

$$\implies c_{NaCl} = 0.48999 - 3\,c_{Na_2SO_3} \qquad \therefore \frac{0.48999 - 3\,c_{Na_2SO_3}}{0.03}\,\mathrm{mL_{Mae}}$$

$M_{Na_2SO_3}$	0.02	0.04	0.06	0.08	0.10
mL_{Mae}	14.33	12.33	10.33	8.33	6.33

Volumes usados

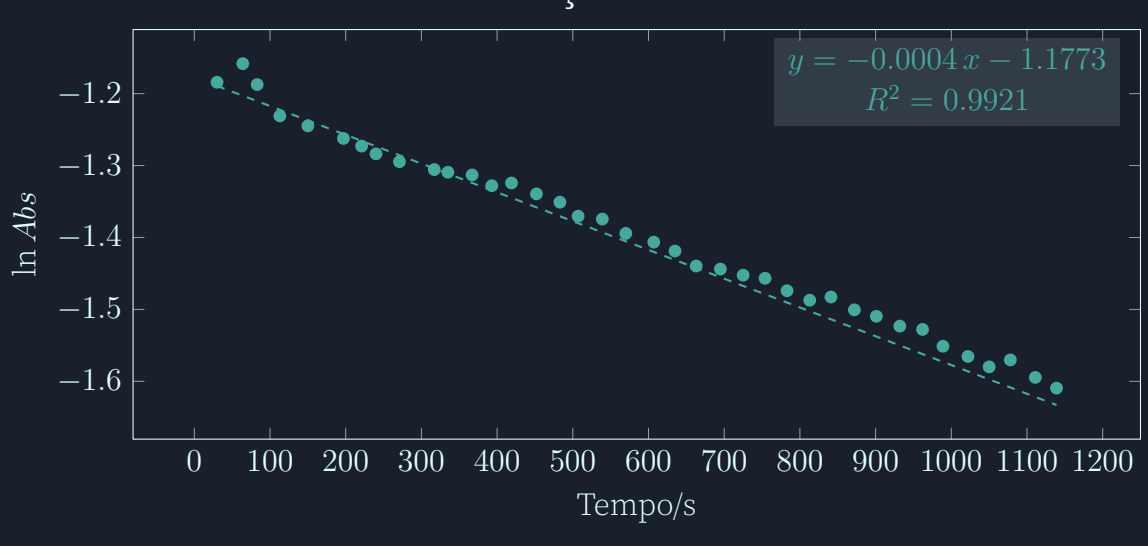
Solução	TB^+/mL	Na_2SO_3/mL	NaCl/mL	H_2O/mL
1	2	2	14	2
2	2	4	12	2
3	2	6	10	2
4	2	8	8	2
5	2	10	6	2

Volume Total: 20 mL

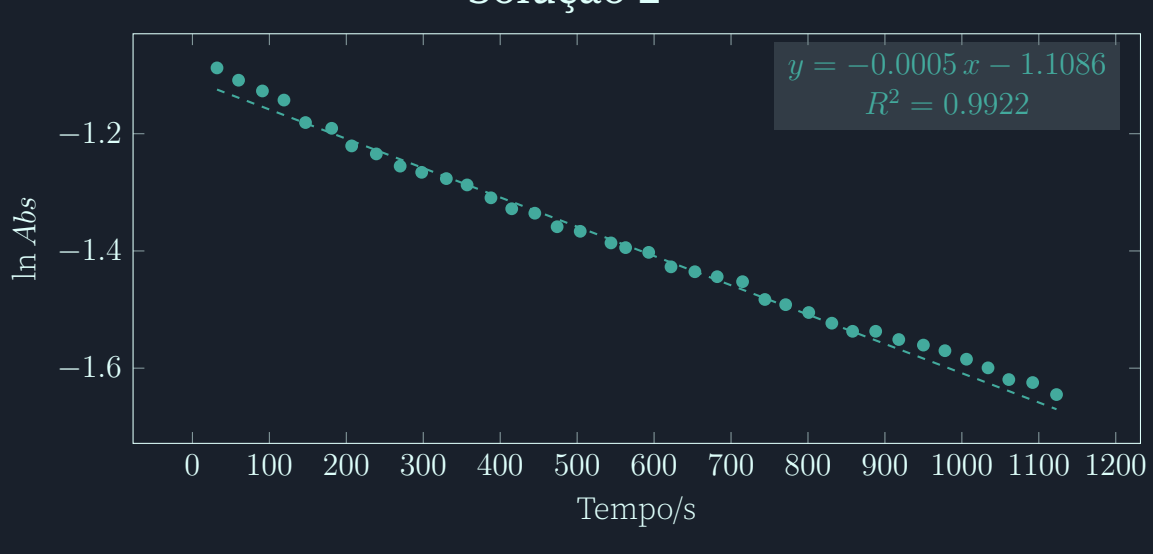
2 Resultados

Absorvâncias

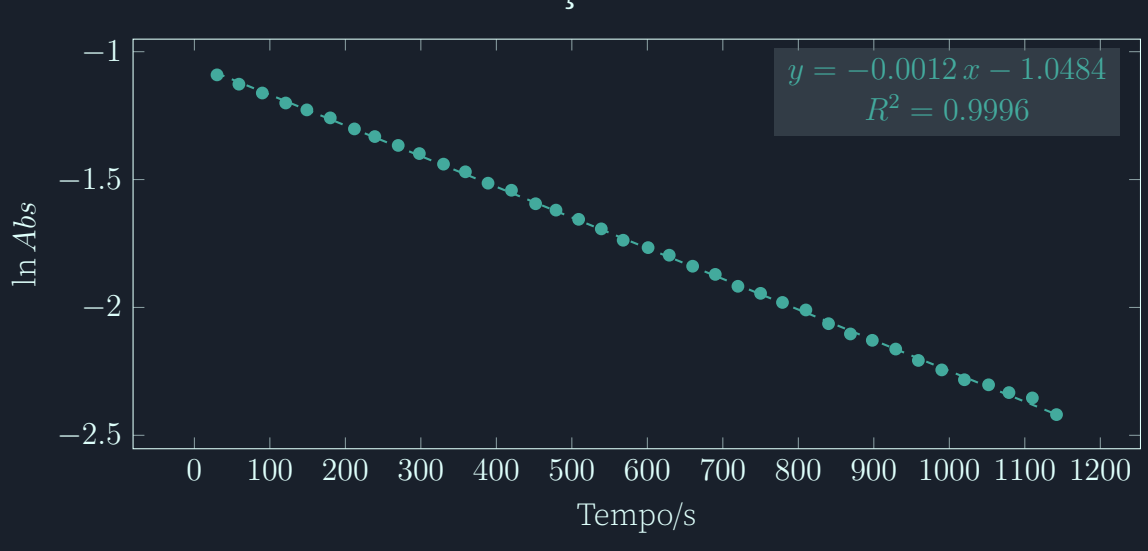
Solução 1



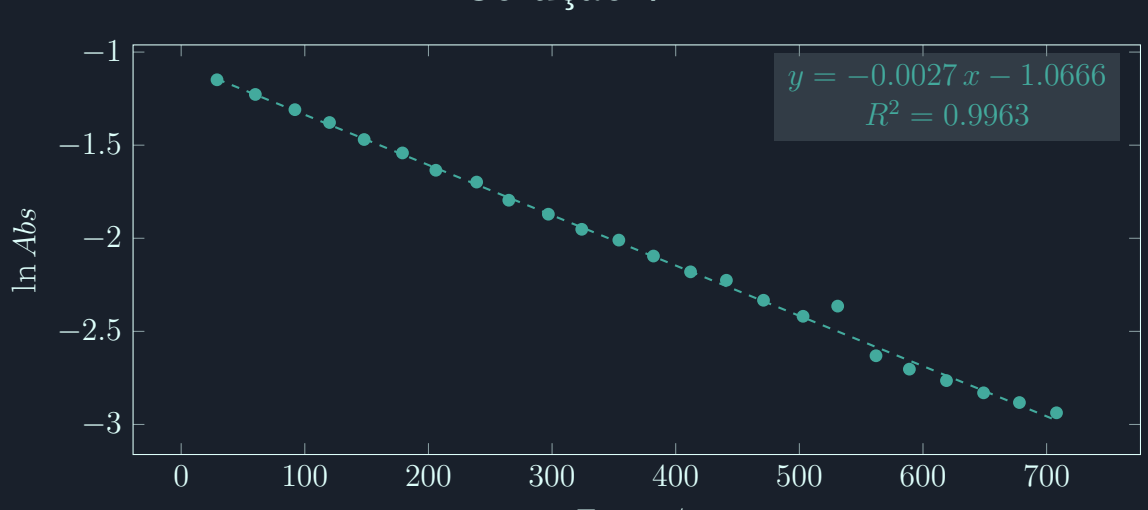
Solução 2



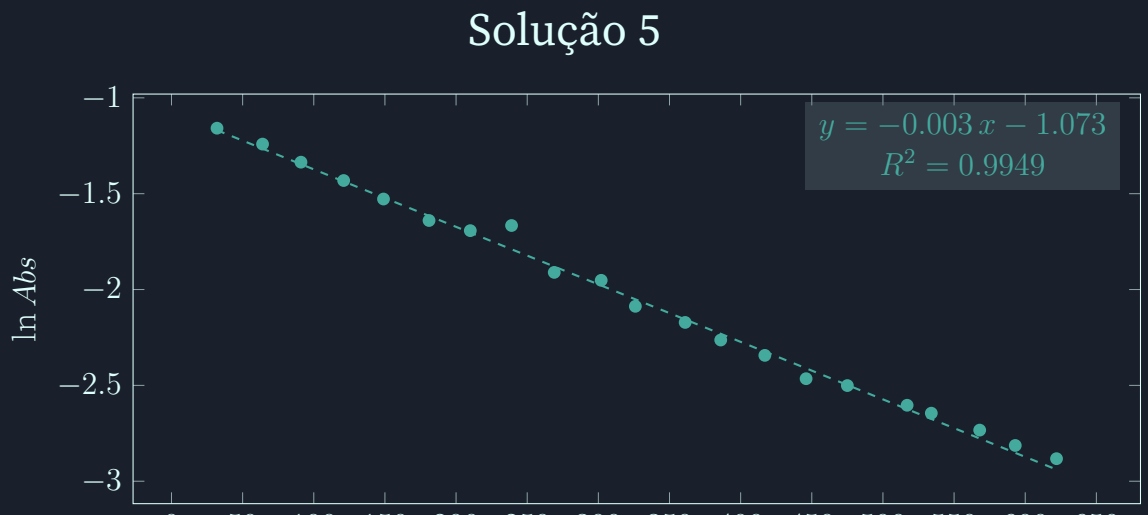
Solução 3



Solução 4



Solução 5



Solução 1

Abs	ln(*Abs*)	Tempo/s
0.306	−1.184 17	30
0.314	−1.158 36	64
0.305	−1.187 44	83
0.292	−1.231 00	113
0.288	−1.244 79	150
0.283	−1.262 31	197
0.280	−1.272 97	221
0.277	−1.283 74	240
0.274	−1.294 63	271
0.271	−1.305 64	317
0.270	−1.309 33	335
0.269	−1.313 04	367
0.265	−1.328 03	393
0.266	−1.324 26	419
0.262	−1.339 41	452
0.259	−1.350 93	483
0.254	−1.370 42	507
0.253	−1.374 37	539
0.248	−1.394 33	570
0.245	−1.406 50	607
0.242	−1.418 82	635
0.237	−1.439 70	663
0.236	−1.443 92	695
0.234	−1.452 43	725
0.233	−1.456 72	754
0.229	−1.474 03	783
0.226	−1.487 22	813
0.227	−1.482 81	841
0.223	−1.500 58	872
0.221	−1.509 59	901
0.218	−1.523 26	932
0.217	−1.527 86	962
0.212	−1.551 17	989
0.209	−1.565 42	1022
0.206	−1.579 88	1050
0.208	−1.570 22	1078
0.203	−1.594 55	1111
0.200	−1.609 44	1139

Solução 3

Abs	ln(*Abs*)	Tempo/s
0.336	−1.090 64	30
0.324	−1.127 01	59
0.313	−1.161 55	90
0.301	−1.200 65	121
0.293	−1.227 58	149
0.284	−1.258 78	180
0.272	−1.301 95	212
0.264	−1.331 81	239
0.255	−1.366 49	270
0.247	−1.398 37	298
0.237	−1.439 70	330
0.230	−1.469 68	359
0.22	−1.514 13	389
0.214	−1.541 78	420
0.203	−1.594 55	452
0.198	−1.619 49	479
0.191	−1.655 48	509
0.184	−1.692 82	539
0.176	−1.737 27	568
0.171	−1.766 09	601
0.166	−1.795 77	629
0.159	−1.838 85	660
0.154	−1.870 80	690
0.147	−1.917 32	720
0.143	−1.944 91	750
0.138	−1.980 50	779
0.134	−2.009 92	810
0.127	−2.063 57	840
0.122	−2.103 73	869
0.119	−2.128 63	898
0.115	−2.162 82	929
0.110	−2.207 27	959
0.106	−2.244 32	990
0.102	−2.282 78	1020
0.100	−2.302 59	1052
0.097	−2.333 04	1079
0.095	−2.353 88	1110
0.089	−2.419 12	1142

Solução 2

Abs	ln(*Abs*)	Tempo/s
0.337	−1.087 67	32
0.330	−1.108 66	60
0.324	−1.127 01	91
0.319	−1.142 56	119
0.307	−1.180 91	147
0.304	−1.190 73	181
0.295	−1.220 78	207
0.291	−1.234 43	239
0.285	−1.255 27	270
0.282	−1.265 85	298
0.279	−1.276 54	330
0.276	−1.287 35	357
0.270	−1.309 33	388
0.265	−1.328 03	415
0.263	−1.335 60	445
0.257	−1.358 68	474
0.255	−1.366 49	504
0.250	−1.386 29	544
0.248	−1.394 33	563
0.246	−1.402 42	593
0.240	−1.427 12	622
0.238	−1.435 48	653
0.236	−1.443 92	682
0.234	−1.452 43	715
0.227	−1.482 81	744
0.225	−1.491 65	771
0.222	−1.505 08	801
0.218	−1.523 26	831
0.215	−1.537 12	858
0.215	−1.537 12	888
0.212	−1.551 17	918
0.210	−1.560 65	950
0.208	−1.570 22	978
0.205	−1.584 75	1006
0.202	−1.599 49	1034
0.198	−1.619 49	1061
0.197	−1.624 55	1092
0.193	−1.645 07	1123

Solução 4

Abs	ln(*Abs*)	Tempo/s
0.317	−1.148 85	29
0.293	−1.227 58	60
0.270	−1.309 33	92
0.252	−1.378 33	120
0.230	−1.469 68	148
0.214	−1.541 78	179
0.195	−1.634 76	206
0.183	−1.698 27	239
0.166	−1.795 77	265
0.154	−1.870 80	297
0.142	−1.951 93	324
0.134	−2.009 92	354
0.123	−2.095 57	382
0.113	−2.180 37	412
0.108	−2.225 62	441
0.097	−2.333 04	471
0.089	−2.419 12	503
0.094	−2.364 46	531
0.072	−2.631 09	562
0.067	−2.703 06	589
0.063	−2.764 62	619
0.059	−2.830 22	649
0.056	−2.882 40	678
0.053	−2.937 46	708

Solução 5

Abs	ln(*Abs*)	Tempo/s
0.314	−1.158 36	32
0.289	−1.241 33	64
0.263	−1.335 60	91
0.239	−1.431 29	121
0.217	−1.527 86	149
0.194	−1.639 90	181
0.184	−1.692 82	210
0.189	−1.666 01	239
0.148	−1.910 54	269
0.142	−1.951 93	302
0.124	−2.087 47	326
0.114	−2.171 56	361
0.104	−2.263 36	386
0.096	−2.343 41	417
0.085	−2.465 10	446
0.082	−2.501 04	475
0.074	−2.603 69	517
0.071	−2.645 08	534
0.065	−2.733 37	568
0.060	−2.813 41	593
0.056	−2.882 40	622

Calculando a constante cinética

Solução	k' s	$[SO_3^{-2}]_0$
1	0.0004	0.02
2	0.0005	0.04
3	0.0012	0.06
4	0.0027	0.08
5	0.0030	0.10