

REFERENCES

- ASTM Standard Test Method D 664-81(1983): Standard Test method for Neutralization Number by Potentiometric Titration. Annual Book of ASTM Standards, Sect. 5, Vol. 05.01, American Society of Testing Materials, Philadelphia , p. 327
- Chang, C. and Fogler, H. S. (1994a). Stabilization of asphaltenes in aliphatic solvents using alkylbenzene-derived amphiphiles. 1. Effect of the chemical structure of amphiphiles on asphaltene stabilization. Langmuir, 10, 1749-1757.
- Chang, C. and Fogler, H. S. (1994b). Stabilization of asphaltenes in aliphatic solvents using alkylbenzene-derived amphiphiles. 2. Study of the asphaltene-amphiphile interaction and structures using fourier transform infrared spectroscopy and small-angle X-ray scattering techniques. Langmuir, 10, 1758-1766
- Dubey, S. T., Doe, P. H. (1991). Base number and wetting properties of crude oils. SPE 22598.
- Izquierdo, A. and O. Rivas. (1997). A global approach to asphaltene deposition problems. SPE 37251.
- Jamaluddin, A.K.M. (1996). Deasphalted oil: A natural asphaltene solvent. SPE 28994.
- Komesvarakul, N. (1998). Physical and chemical characteristics of asphaltene fractions affecting dissolution kinetics. M.S. Thesis, The Petroleum and Petrochemical College, Chulalongkorn university.
- Leontaritis, K.J. (1989). Asphaltene deposition: A comprehensive description of problem manifestations and modeling approaches. SPE 18892, 599-613.

- Permsukarome, P. (1996). Kinetic study of asphaltene dissolution by amphiphile/alkane solutions. M.S. Thesis, The Petroleum and Petrochemical College, Chulalongkorn university, Bangkok, Thailand.
- Pumpaisarnkul, W. (1997). Dissolution kinetics of fractionated asphaltenes. M.S. Thesis, The Petroleum and Petrochemical College, Chulalongkorn universit, Bangkok, Thailand.
- Skoog, D. A., West, D. M., and Holler, F. J. (1990). Introduction to analytical chemistry. 5th Ed. New York: Saunders College Publishing.
- Soontravanich, S. (1999). Dissolution study of asphaltene aged under low pressure. M. S. Thesis. The Petroleum and Petrochemical College, Chulalongkorn University, Bangkok, Thailand.
- Speight, J. G. (1997). The chemical and physical structure of petroleum: effects on recovery operations. New York Marcel Dekker, Inc.
- Speight, J. G. (1999) The Chemistry and Technology of Petroleum. New York Marcel Dekker, Inc.
- Tantayakom,V. (1998). Dissolution if asphaltene in asphaltic sludge. M.S. Thesis, The Petroleum and Petrochemical College, Chulalongkorn university, Bangkok, Thailand.

APPENDIX A
ACID/BASE TITRATION

A1 Reagent Preparation

1. Prepare 0.03 N KOH standard alcoholic
 - Weigh 2 g of KOH in 1L of isopropanol
 - Boil and stir about 1 h.
2. Prepare 0.03 N HCl standard alcoholic
 - Pipet HCl (spgr. 1.19) 3 ml
 - Dilute with isopropanol 1 L
3. Prepare 0.05 N $\text{KHC}_8\text{H}_4\text{O}_4$
 - Weigh 10.211 in 1 L of CO_2 -free water
4. Standardize KOH by Potentiometric titration using $\text{KHC}_8\text{H}_4\text{O}_4$ to get the exact normality (N1)
5. Standardize HCl by Potentiometric titration using KOH to get exact normality (N2).
6. Prepare titration solvent
 - Add 330 ml of toluene into 167.5 ml of isopropanol and 2.5 ml of water

A2 Blank Titration (base titration)

1. Weigh 0.0538 g of 9-Antracene carboxylic acid into 125-ml titration solvent.
2. Add small amount of KOH into the system, read mV
3. Titrate in this manner until reach the end point

A3 Blank titration (acid titration)

1. Pipet 0.5 ml of Triethylamine diluted 1:19 with titration solvent (0.18 mmol) into 125-ml titration solvent.
2. Add small amount of HCl solution into the system, read mV
3. Titrate in this manner until reach the end point

A4 Calculation

1. Calculate dE/dV
2. Plot graph between Volume of titrant and dE/dV
3. Read approximate inflection point (the maximum point)
4. Fit E vs. volume of titrant curve with Polynomial degree four
5. Calculate volume of titrant that makes d^2E/dv^2 equal zero which gives two values
6. Choose the one that is near approximate inflection point
7. Calculate the total acid(base) number as follows

$$\text{Total acid(base) number,mg KOH/g} = (A-B)*N*56.1/W$$

Where

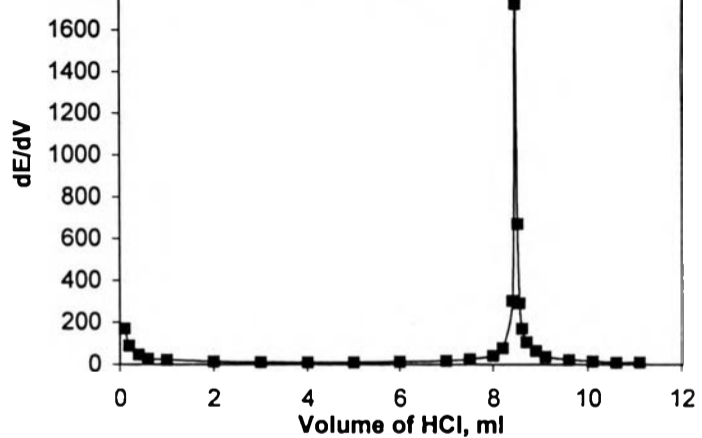
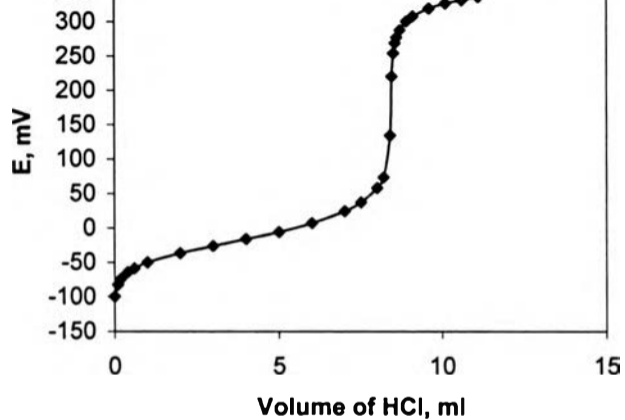
A is ml of alc.KOH(HCl) used to titrate sample to the end point.

B is ml of alc. KOH(HCl) used to titrate solvent to end point.

N is the exact normality of alcoholic KOH(HCl), mmol/ml.

W is the mass of the sample in grams.

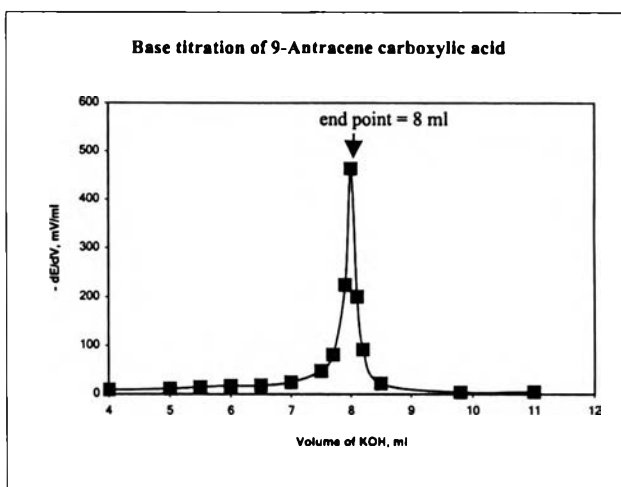
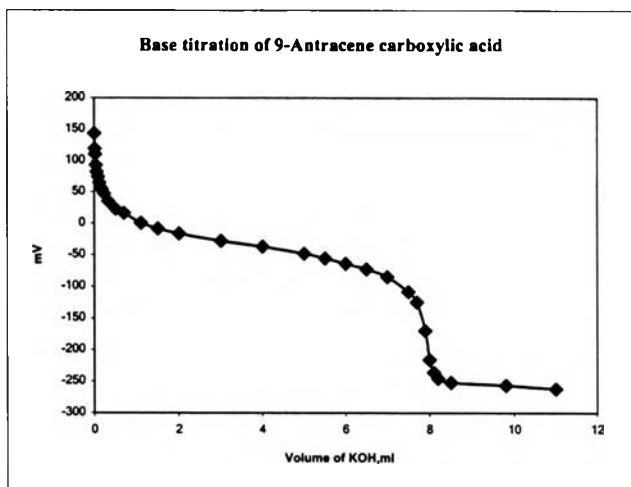
73.6	89
64.3	46.5
58.8	27.5
-50	22
36.6	13.4
26.2	10.4
-16	10.2
-5.8	10.2
7.3	13.1
24.7	17.4
37.4	25.4
58	41.2
73.5	77.5
34.1	303
20.4	1726
254	672
68.6	292
77.1	170
87.7	106
00.6	64.5



of base titration

carboxylic acid 0.0538 g
 ent 125 ml

V	-dE/dV
143.5	
119	2450
110	900
92.5	875
81.9	530
74.2	257
64.7	317
57.2	250
53.5	123
47	130
35	120
22.7	72
16	33.5
0.5	38.75
-8.5	22.5
-16.3	15.6
-28	11.7
-37	9
-48.3	11.3
-55.5	14.4
-64	17
-72.8	17.6
-84.9	24.2
-108.7	47.6
-125	81.5
-170	225
-216.4	464
-236.5	201
-245.7	92
-252.2	21.666667
-256.8	3.5384615
-262.3	4.5833333



original
 % DBSA/Heptane
 Absorbance of DBSA/Heptane/Toluene 0.0321
 calibration factor : 0.064544845 mg/ml
 25 mg
 73.3 mg
 73.3 mg
 25 mg

Sample	toluene	dilution factor	read absorbance	real abs.	conc., mg/ml	actual conc., mg/ml	asph. Dissolved, mg	Accu Dissolved, mg	% dissolved	In(C/Co)
455	5	121	0.545	0.5129	0.033105051	4.005711186	12.01713356	12.01713356	48.0685342	-0.6552453
455	5	121	0.2207	0.1886	0.012173158	1.472952095	4.418856286	16.43598984	65.7439594	-1.0713073
455	5	121	0.1358	0.1037	0.0066933	0.809889355	2.429668064	18.86565791	75.4626316	-1.404973
455	5	121	0.1094	0.0773	0.004989317	0.603707301	1.811121903	20.67677981	82.7071192	-1.7548753
455	5	121	0.0901	0.058	0.003743601	0.452975724	1.358927172	22.03570698	88.1428279	-2.1322373
455	5	121	0.0765	0.0444	0.002865791	0.346760727	1.04028218	23.07598916	92.3039567	-2.5644638
455	5	121	0.0626	0.0305	0.001968618	0.238202751	0.714608254	23.79059742	95.1623897	-3.0287493
5	5	11	0.2555	0.2234	0.014419318	0.158612503	0.475837508	24.26643492	97.0657397	-3.5287148
5	5	11	0.1401	0.108	0.006970843	0.076678276	0.230037828	24.49647275	97.985891	-3.9049933
5	5	11	0.1044	0.0723	0.004666592	0.051332515	0.153997546	24.6504703	98.6018812	-4.2700426
5	5	11	0.0902	0.0581	0.003750056	0.041250611	0.123751832	24.77422213	99.0968885	-4.7070795
5	5	11	0.0636	0.0315	0.002033163	0.022364789	0.067094367	24.8413165	99.365266	-5.0597194
5	5	11	0.0557	0.0236	0.001523258	0.016755842	0.050267525	24.89158402	99.5663361	-5.4406556
5	5	11	0.0464	0.0143	0.000922991	0.010152904	0.030458712	24.92204274	99.6881709	-5.7704703
5	5	11	0.0479	0.0158	0.001019809	0.011217894	0.033653682	24.95589642	99.8227857	-6.3355656
5	5	11	0.0422	0.0101	0.000851903	0.007170932	0.021512797	24.97720922	99.9088369	-7.0002748
5	5	11	0.0389	0.0068	0.000438905	0.004827954	0.014483863	24.99169308	99.9667723	-8.009542
5	5	11	0.038	0.0039	0.000251725	0.002768974	0.008306922	25	100	#NUM!

APPENDIX B
 DISSOLUTION STUDY DATA

20C 1 daysN2 Date: 30/11/99
 DBSA/Heptane

Absorbance of DBSA/Heptane/Toluene 0.0329
 calibration factor: 0.0579 mg/ml

	toluene	dilution factor	read absorbance	real abs	conc., mg/ml	actual conc., mg/ml	asph	Disolved, mg	Accu. Disolved,mg	% dissolved	In(C/Co)
							0	0	0	0	
55	5	121	0.3331	0.3002	0.01738158	2.10317118	6.30951354	6.30951354	25.2380542	-0.2908612	
55	5	121	0.1844	0.1515	0.00877185	1.06139385	3.18418155	9.49369509	37.9747804	-0.4776291	
55	5	121	0.1092	0.0763	0.00441777	0.53455017	1.60365051	11.0973456	44.3893824	-0.586796	
55	5	121	0.0842	0.0513	0.00297027	0.35940267	1.07820801	12.17555361	48.7022144	-0.6675226	
55	5	121	0.0764	0.0435	0.00251865	0.30475665	0.91426995	13.08982356	52.3592942	-0.7414826	
5	11		0.4204	0.3875	0.02243625	0.24679875	0.74039625	13.83021981	55.3208792	-0.8056639	
5	11		0.364	0.3311	0.01917069	0.21087759	0.63263277	14.46285258	57.8514103	-0.863969	
5	11		0.3253	0.2924	0.01692996	0.18622956	0.55868868	15.02154126	60.086165	-0.9184472	
5	11		0.3086	0.2757	0.01596303	0.17559333	0.52677999	15.54832125	62.193285	-0.9726835	
5	11		0.2654	0.2325	0.01346175	0.14807925	0.44423775	15.992559	63.970236	-1.0208248	
5	11		0.239	0.2061	0.01193319	0.13126509	0.39379527	16.38635427	65.5454171	-1.0655282	
5	11		0.2299	0.197	0.0114063	0.1254693	0.3764079	16.76276217	67.0510487	-1.1102108	
5	11		0.2101	0.1772	0.01025988	0.11285868	0.33857604	17.10133821	68.4053528	-1.1521825	
5	11		0.1897	0.1568	0.00907872	0.09986592	0.29959776	17.40093597	69.6037439	-1.1908507	
5	11		0.1838	0.1509	0.00873711	0.09610821	0.28832463	17.6892606	70.7570424	-1.2295314	
5	11		0.1688	0.1359	0.00786861	0.08655471	0.25966413	17.94892473	71.7956989	-1.2656957	
5	11		0.1681	0.1352	0.00782808	0.08610888	0.25832664	18.20725137	72.8290055	-1.3030202	
5	11		0.1612	0.1283	0.00742857	0.08171427	0.24514281	18.45239418	73.8095767	-1.3397764	
5	11		0.1553	0.1224	0.00708696	0.07795656	0.23386968	18.68626386	74.7450554	-1.3761482	
5	11		0.1475	0.1146	0.00663534	0.07298874	0.21896622	18.90523008	75.6209203	-1.4114448	
5	11		0.1266	0.0937	0.00542523	0.05967753	0.17903259	19.08426267	76.3370507	-1.4412597	
5	11		0.1261	0.0932	0.00539628	0.05935908	0.17807724	19.26233991	77.0493596	-1.4718243	
5	11		0.1215	0.0886	0.00512994	0.05642934	0.16928802	19.43162793	77.7265117	-1.5017731	
5	11		0.1163	0.0834	0.00482886	0.05311746	0.15935238	19.59098031	78.3639212	-1.530808	
5	11		0.1118	0.0789	0.00456831	0.05025141	0.15075423	19.74173454	78.9669382	-1.5590746	
5	11		0.1086	0.0757	0.00438303	0.04821333	0.14463999	19.88637453	79.5454981	-1.5869672	
5	11		0.1013	0.0684	0.00396036	0.04356396	0.13069188	20.01706641	80.0682656	-1.612857	
5	11		0.0979	0.065	0.0037635	0.0413985	0.1241955	20.14126191	80.5650476	-1.6380971	
5	11		0.0973	0.0644	0.00372876	0.04101636	0.12304908	20.26431099	81.057244	-1.6637486	
5	11		0.0918	0.0589	0.00341031	0.03751341	0.11254023	20.37685122	81.5074049	-1.6877998	
5	11		0.0876	0.0547	0.00316713	0.03483843	0.10451529	20.48136651	81.925466	-1.7106662	
5	11		0.0874	0.0545	0.00315555	0.03471105	0.10413315	20.58549966	82.3419986	-1.7339812	
5	11		0.087	0.0291	0.00168489	0.01853379	0.05560137	20.64110103	82.5644041	-1.7466563	

Zuata 120C 3 daysN2 Date 2/12/99

10 wt.% DBSA/Heptane

20 °C

1 ml/min Absorbance of DBSA/Heptane/Toluene 0.0371

25 mg calibration factor 0.0598 mg/ml

74.6 mg

79.1 mg

20.5 mg

sample	toluene	dilution factor	read absorbance	real abs.	conc., mg/ml	actual conc., mg/ml asph	Dissolved, mg Accu	Dissolved,mg	% dissolved	ln(C/Co)
0.045455	5	121	0.2078	0.1707	0.01020786	1.23515106	3.70545318	3.70545318	14.8218127	-0.1604248
0.045455	5	121	0.203	0.1659	0.00992082	1.20041922	3.60125766	7.30671084	29.2268434	-0.3456904
0.045455	5	121	0.1309	0.0938	0.00560924	0.67871804	2.03615412	9.34286496	37.3714598	-0.4679491
0.045455	5	121	0.097	0.0599	0.00358202	0.43342442	1.30027326	10.64313822	42.5725529	-0.5546478
0.045455	5	121	0.0777	0.0406	0.00242788	0.29377348	0.88132044	11.52445866	46.0978346	-0.6179995
0.5	5	11	0.5115	0.4744	0.02836912	0.31206032	0.93618096	12.46063962	49.8425585	-0.690033
0.5	5	11	0.4178	0.3807	0.02276586	0.25042446	0.75127338	13.211913	52.847652	-0.7517864
0.5	5	11	0.3472	0.3101	0.01854398	0.20398378	0.61195134	13.82386434	55.2954574	-0.8050951
0.5	5	11	0.3146	0.2775	0.0165945	0.1825395	0.5476185	14.37148284	57.4859314	-0.8553351
0.5	5	11	0.27	0.2329	0.01392742	0.15320162	0.45960486	14.8310877	59.3243508	-0.8995406
0.5	5	11	0.2534	0.2163	0.01293474	0.14228214	0.42684642	15.25793412	61.0317365	-0.9424226
0.5	5	11	0.2316	0.1945	0.0116311	0.1279421	0.3838263	15.64176042	62.5670417	-0.9826186
0.5	5	11	0.2277	0.1906	0.01139788	0.12537668	0.37613004	16.01789046	64.0715618	-1.0236411
0.5	5	11	0.198	0.1609	0.00962182	0.10584002	0.31752006	16.33541052	65.3416421	-1.0596313
0.5	5	11	0.1784	0.1413	0.00844974	0.09294714	0.27884142	16.61425194	66.4570078	-1.0923422
0.5	5	11	0.1726	0.1355	0.0081029	0.0891319	0.2673957	16.88164764	67.5265906	-1.1247486
0.5	5	11	0.1738	0.1367	0.00817466	0.08992126	0.26976378	17.15141142	68.6056457	-1.1585421
0.5	5	11	0.1657	0.1286	0.00769028	0.08459308	0.25377924	17.40519066	69.6207626	-1.1914108
0.5	5	11	0.161	0.1239	0.00740922	0.08150142	0.24450426	17.64969492	70.5987797	-1.224134
0.5	5	11	0.1487	0.1116	0.00667368	0.07341048	0.22023144	17.86992636	71.4797054	-1.2545543
0.5	5	11	0.1406	0.1035	0.0061893	0.0680823	0.2042469	18.07417326	72.296693	-1.2836184
0.5	5	11	0.1369	0.0998	0.00596804	0.06564844	0.19694532	18.27111858	73.0844743	-1.3124669
0.5	5	11	0.1321	0.095	0.005681	0.062491	0.187473	18.45859158	73.8343663	-1.3407233
0.5	5	11	0.1116	0.0745	0.0044551	0.0490061	0.1470183	18.60560988	74.4224395	-1.3634548
0.5	5	11	0.1032	0.0661	0.00395278	0.04348058	0.13044174	18.73605162	74.9442065	-1.3840851
0.5	5	11	0.1001	0.063	0.0037674	0.0414414	0.1243242	18.88037582	75.4415033	-1.4041123
0.5	5	11	0.0972	0.0601	0.00359398	0.03953378	0.11860134	18.97897716	75.9159086	-1.4236187
0.5	5	11	0.0929	0.0558	0.00333684	0.03670524	0.11011572	19.08909288	76.3563715	-1.4420765
0.5	5	11	0.0903	0.0532	0.00318136	0.03499496	0.10498488	19.19407776	76.776311	-1.4599974
0.5	5	11	0.0894	0.0523	0.00312754	0.03440294	0.10320882	19.29728658	77.1891463	-1.4779337
0.5	5	11	0.0884	0.0513	0.00306774	0.03374514	0.10123542	19.398522	77.594088	-1.4958453
0.5	5	11	0.0849	0.0478	0.00285844	0.03144284	0.09432852	19.49285052	77.9714021	-1.5128287
0.5	5	11	0.0813	0.0442	0.00264316	0.02907476	0.08722428	19.5800748	78.3202992	-1.5287938

0.045455	5	121	0.1888	0.1485	0.004360113	0.527573678	1.582721034	1.582721034	6.33088413	-0.0654017
0.045455	5	121	0.1814	0.1411	0.004142841	0.501283811	1.503851433	3.086572467	12.3462899	-0.1317762
0.045455	5	121	0.1336	0.0933	0.002739384	0.331465482	0.994396447	4.080968914	16.3238757	-0.1782165
0.045455	5	121	0.1116	0.0713	0.002093441	0.253306419	0.759919257	4.840888171	19.3635527	-0.2152194
0.045455	5	121	0.0891	0.0488	0.001432818	0.173371013	0.52011304	5.361001211	21.4440048	-0.2413585
0.5	5	11	0.48	0.4397	0.012910045	0.142010497	0.42603149	5.787032701	23.1481308	-0.2632904
0.5	5	11	0.4184	0.3761	0.011042684	0.12146952	0.364408559	6.15144126	24.605765	-0.2824394
0.5	5	11	0.3871	0.3468	0.010182405	0.112006459	0.336019378	6.487460638	25.9498426	-0.3004275
0.5	5	11	0.3541	0.3138	0.009213491	0.101348405	0.304045216	6.791505854	27.1660234	-0.3169876
0.5	5	11	0.312	0.2717	0.007977392	0.087751312	0.263253936	7.05475979	28.2190392	-0.3315509
0.5	5	11	0.2714	0.2311	0.006785334	0.074638676	0.223916027	7.278675818	29.1147033	-0.3441072
0.5	5	11	0.2421	0.2018	0.005925056	0.065175616	0.195526847	7.474202665	29.8968107	-0.3552019
0.5	5	11	0.2228	0.1825	0.005358388	0.058942269	0.176826807	7.651029471	30.6041179	-0.3653427
0.5	5	11	0.205	0.1647	0.004835762	0.053193379	0.159580137	7.810609608	31.2424384	-0.3745835
0.5	5	11	0.2025	0.1622	0.004762359	0.052385951	0.157157852	7.967767481	31.8710698	-0.3837682
0.5	5	11	0.1913	0.151	0.004433516	0.048768672	0.146306015	8.114073476	32.4562939	-0.3923953
0.5	5	11	0.1858	0.1455	0.00427203	0.046992329	0.140976988	8.255050484	33.0202019	-0.4007791
0.5	5	11	0.1643	0.124	0.003640768	0.040048446	0.120145337	8.375195801	33.5007832	-0.40798
0.5	5	11	0.1591	0.1188	0.00348809	0.038368995	0.115106984	8.490302786	33.9612111	-0.4149279
0.5	5	11	0.1426	0.1023	0.003003633	0.033039968	0.099119903	8.589422689	34.3576908	-0.4209497
0.5	5	11	0.1505	0.1102	0.003235586	0.035591441	0.106774324	8.696197013	34.7847881	-0.4274774
0.5	5	11	0.1384	0.0981	0.002880317	0.031683488	0.095050464	8.791247477	35.1649899	-0.4333244
0.5	5	11	0.137	0.0967	0.002839212	0.031231328	0.093693985	8.884941461	35.5397658	-0.4391217

Zueta 120C 7 daysN2 Date: 1/12/99

10 wt.% DBSA/Heptane

20 °C

1 ml/min Absorbance of DBSA/Heptane/Toluene 0.0333

25 mg calibration factor : 0.058583392 mg/ml

75.9 mg

93.3 mg

7.6 mg

sample	toluene	dilution factor	read absorbance	real abs.	conc., mg/ml	actual conc., mg/ml	asph. Dissolved, mg	Accu. Dissolved,mg	% dissolved	ln(C/C0)
0.5	5	11	0.6822	0.6489	0.038014763	0.418162393	1.254487179	1.254487179	5.01794872	-0.0514822
0.5	5	11	0.3828	0.3295	0.019303228	0.212335504	0.637006512	1.891493691	7.56597477	-0.078675
0.5	5	11	0.3167	0.2834	0.016602533	0.182627866	0.547883598	2.439377289	9.75750916	-0.1026698
0.5	5	11	0.2356	0.2023	0.01185142	0.130365622	0.391096866	2.830474155	11.3218966	-0.1201572
0.5	5	11	0.2392	0.2059	0.01206232	0.132685524	0.398056573	3.228530729	12.9141229	-0.1382755
0.5	5	11	0.2116	0.1783	0.010445419	0.114899607	0.34469882	3.573229548	14.2929182	-0.1542347
0.5	5	11	0.2088	0.1755	0.010281385	0.113095238	0.339285714	3.912515263	15.6500611	-0.1701961
0.5	5	11	0.2028	0.1695	0.009929885	0.109228734	0.327686203	4.240201465	16.9608059	-0.1858575
0.5	5	11	0.2051	0.1718	0.010064627	0.110710894	0.332132682	4.572334147	18.2893366	-0.2019857
0.5	5	11	0.2103	0.177	0.01036926	0.114061864	0.342185592	4.91451974	19.658079	-0.2188786
0.5	5	11	0.2555	0.2222	0.01301723	0.143189527	0.42956858	5.344088319	21.3763533	-0.2404977
0.5	5	11	0.2164	0.1831	0.010726619	0.11799281	0.353978429	5.698066748	22.792267	-0.2586706
0.5	5	11	0.1593	0.128	0.007381507	0.081198581	0.243589744	5.941656492	23.766626	-0.2713708
0.5	5	11	0.1159	0.0826	0.004838988	0.05322887	0.15968661	6.101343101	24.4053724	-0.279785
0.5	5	11	0.0923	0.059	0.00345642	0.038020621	0.114061864	6.215404965	24.8616199	-0.2858387
0.5	5	11	0.0871	0.0538	0.003151786	0.034669651	0.104008954	6.319413919	25.2776557	-0.291391
0.5	5	11	0.0779	0.0446	0.002612819	0.028741012	0.086223036	6.405636956	25.6225478	-0.2960174
0.5	5	11	0.0735	0.0402	0.002355052	0.025905576	0.077716728	6.483353683	25.9334147	-0.3002057
0.5	5	11	0.0688	0.0355	0.00207971	0.022876815	0.068830444	6.551984127	26.2079365	-0.303919
0.5	5	11	0.0714	0.0381	0.002232027	0.0245523	0.073656899	6.625641026	26.5025641	-0.3079197
0.5	5	11	0.0969	0.0636	0.003725904	0.040984941	0.122954823	6.748595849	26.9943834	-0.3146338
0.5	5	11	0.0879	0.0546	0.003198653	0.035185185	0.105555556	6.854151404	27.4166056	-0.320434
0.5	5	11	0.0734	0.0401	0.002349194	0.025841134	0.077523403	6.931674807	27.7266992	-0.3247154
0.5	5	11	0.0816	0.0483	0.002829578	0.031125356	0.093376068	7.025050875	28.1002035	-0.3298988
0.5	5	11	0.0645	0.0312	0.001827802	0.02010582	0.06031746	7.085368335	28.3414733	-0.333258
0.5	5	11	0.0672	0.0339	0.001985977	0.021845747	0.065537241	7.150905576	28.6036223	-0.3369231
0.5	5	11	0.0625	0.0292	0.001710635	0.018816985	0.056450956	7.207356532	28.8294261	-0.3400907
0.5	5	11	0.0641	0.0308	0.001804368	0.019848053	0.05954416	7.266900692	29.0676028	-0.3434429
0.5	5	11	0.0683	0.035	0.002050419	0.022554606	0.067663818	7.33456451	29.338258	-0.3472659
0.5	5	11	0.0672	0.0339	0.001985977	0.021845747	0.065537241	7.40010175	29.600407	-0.3509827
0.5	5	11	0.0618	0.0285	0.001669627	0.018365893	0.05509768	7.45519943	29.8207977	-0.3541182
0.5	5	11	0.066	0.0327	0.001915677	0.021072446	0.063217338	7.518416768	30.0736671	-0.3577279
0.5	5	11	0.0755	0.0422	0.002472219	0.027194411	0.081583232	7.6	30.4	-0.3624056

Zuata 60C 3 daysN2 Date: 4/1/00

10 wt % DBSA/Heptane

20 °C

1 ml/min Absorbance of DBSA/Heptane/Toluene: 0.0371

25 mg calibration factor: 0.0623 mg/ml

74.6 mg

79.1 mg

20.5 mg

sample	toluene	dilution factor	read absorbance	real abs	conc., mg/ml	actual conc., mg/ml asph	Dissolved, mg Accu	Dissolved,mg	% dissolved	ln(C/Co)
0.045455	5	121	0.2078	0.1707	0.01020786	1.23515106	3.70545318	3.70545318	14.8218127	-0.1604248
0.045455	5	121	0.203	0.1659	0.00992082	1.20041922	3.60125766	7.30671084	29.2268434	-0.3456904
0.045455	5	121	0.1309	0.0938	0.00560924	0.67871804	2.03615412	9.34286496	37.3714598	-0.4679491
0.045455	5	121	0.097	0.0599	0.00358202	0.43342442	1.30027326	10.64313822	42.5725529	-0.5546478
0.045455	5	121	0.0777	0.0406	0.00242788	0.29377348	0.88132044	11.52445866	46.0978346	-0.6179995
0.5	5	11	0.5115	0.4744	0.02836912	0.31206032	0.93618096	12.46063962	49.8425585	-0.6900033
0.5	5	11	0.4178	0.3807	0.02276586	0.25042446	0.75127338	13.211913	52.847652	-0.7517864
0.5	5	11	0.3472	0.3101	0.01854398	0.20398378	0.61195134	13.82386434	55.2954574	-0.8050951
0.5	5	11	0.3146	0.2775	0.0165945	0.1825395	0.5476185	14.37148284	57.4859314	-0.8553351
0.5	5	11	0.27	0.2329	0.01392742	0.15320162	0.45960486	14.8310877	59.3243508	-0.8995406
0.5	5	11	0.2534	0.2163	0.01293474	0.14228214	0.42684642	15.25793412	61.0317365	-0.9424226
0.5	5	11	0.2316	0.1945	0.0116311	0.1279421	0.3838263	15.64176042	62.5670417	-0.9826186
0.5	5	11	0.2277	0.1906	0.01139788	0.12537868	0.37613004	16.01789046	64.0715618	-1.0236411
0.5	5	11	0.198	0.1609	0.00962182	0.10584002	0.31752006	16.33541052	65.3418421	-1.0596313
0.5	5	11	0.1784	0.1413	0.00844974	0.09294714	0.27884142	16.61425194	66.4570078	-1.0923422
0.5	5	11	0.1726	0.1355	0.0081029	0.0891319	0.2673957	16.88164764	67.5265906	-1.1247486
0.5	5	11	0.1738	0.1367	0.00817466	0.08992126	0.26976378	17.15141142	68.6056457	-1.1585421
0.5	5	11	0.1657	0.1286	0.00769028	0.08459308	0.25377924	17.40519066	69.6207626	-1.1914108
0.5	5	11	0.161	0.1239	0.00740922	0.08150142	0.24450426	17.64969492	70.5987797	-1.224134
0.5	5	11	0.1487	0.1116	0.00667368	0.07341048	0.22023144	17.86992636	71.4797054	-1.2545543
0.5	5	11	0.1406	0.1035	0.0061893	0.0680823	0.2042469	18.07417326	72.296693	-1.2836184
0.5	5	11	0.1369	0.0998	0.00596804	0.06564844	0.19694532	18.27111858	73.0844743	-1.3124669
0.5	5	11	0.1321	0.095	0.005681	0.062491	0.187473	18.45859158	73.8343663	-1.3407233
0.5	5	11	0.1116	0.0745	0.0044551	0.0490061	0.1470183	18.60560988	74.4224395	-1.3634548
0.5	5	11	0.1032	0.0661	0.00395278	0.04348058	0.13044174	18.73605162	74.9442065	-1.3840651
0.5	5	11	0.1001	0.063	0.0037674	0.0414414	0.1243242	18.86037582	75.4415033	-1.4041123
0.5	5	11	0.0972	0.0601	0.00359398	0.03953378	0.11860134	18.97897716	75.9159086	-1.4236187
0.5	5	11	0.0929	0.0558	0.00333684	0.03670524	0.11011572	19.08909288	76.3563715	-1.4420765
0.5	5	11	0.0903	0.0532	0.00318136	0.03499496	0.10498488	19.19407776	76.776311	-1.4599974
0.5	5	11	0.0894	0.0523	0.00312754	0.03440294	0.10320882	19.29728658	77.1891463	-1.4779337
0.5	5	11	0.0884	0.0513	0.00306774	0.03374514	0.10123542	19.398522	77.594088	-1.4958453
0.5	5	11	0.0849	0.0478	0.00285844	0.03144284	0.09432852	19.49285052	77.9714021	-1.5128287
0.5	5	11	0.0813	0.0442	0.00264316	0.02907476	0.08722428	19.5800748	78.3202992	-1.5287938

Zueta 90C 3 days N2 Date: 2/12/99

10 wt.% DBSA/Heptane

20 °C

1 ml/min Absorbance of DBSA/Heptane/Toluene 0.0378

25 mg calibration factor: 0.062 mg/ml

77.8 mg

82.3 mg

20.5 mg

sample	toluene	dilution factor	read absorbance	real abs	conc., mg/ml	actual conc., mg/ml asph	Disolved, mg	Accu. Disolved,mg	% disolved	ln(C/Co)
							0	0	0	0
0.045455	5	121	0.2477	0.2099	0.0130138	1.5746698	4.7240094	4.7240094	18.8960376	-0.2619357
0.045455	5	121	0.1952	0.1574	0.0097588	1.1808148	3.5424444	8.2664538	33.0658152	-0.516243
0.045455	5	121	0.1207	0.0829	0.0051398	0.6219158	1.8657474	10.1322012	40.5288048	-0.6817202
0.045455	5	121	0.0914	0.0536	0.0033232	0.4021072	1.2063216	11.3385228	45.3540912	-0.8054175
0.045455	5	121	0.0777	0.0399	0.0024738	0.2993298	0.8979894	12.2365122	48.9460488	-0.9085781
0.5	5	11	0.4576	0.4198	0.0260276	0.2863036	0.8589108	13.095423	52.381892	-1.0183266
0.5	5	11	0.3788	0.341	0.021142	0.232562	0.697686	13.793109	55.172436	-1.1172894
0.5	5	11	0.3224	0.2846	0.0176452	0.1940972	0.5822916	14.3754006	57.5016024	-1.2081115
0.5	5	11	0.3138	0.276	0.0171112	0.188232	0.564696	14.9400966	59.7603864	-1.3048442
0.5	5	11	0.2903	0.2525	0.015655	0.172205	0.516615	15.4567116	61.8268464	-1.4023666
0.5	5	11	0.2741	0.2363	0.0146506	0.1611566	0.4834698	15.9401814	63.7607256	-1.503142
0.5	5	11	0.2492	0.2114	0.0131068	0.1441748	0.4325244	16.3727058	65.4908232	-1.6028029
0.5	5	11	0.2232	0.1854	0.0114948	0.1264428	0.3793284	16.7520342	67.0081368	-1.6992116
0.5	5	11	0.2192	0.1814	0.0112468	0.1237148	0.3711444	17.1231786	68.4927144	-1.80349
0.5	5	11	0.2134	0.1756	0.0108872	0.1197592	0.3592776	17.4824562	69.9298248	-1.9159817
0.5	5	11	0.1857	0.1479	0.0091698	0.1008678	0.3026034	17.7850596	71.1402384	-2.0216549
0.5	5	11	0.1853	0.1475	0.009145	0.100595	0.301785	18.0868446	72.3473784	-2.1394897
0.5	5	11	0.1598	0.122	0.007564	0.083204	0.249612	18.3364566	73.3458264	-2.2486775
0.5	5	11	0.1521	0.1143	0.0070866	0.0779526	0.2338578	18.5703144	74.2812576	-2.3630678
0.5	5	11	0.1439	0.1061	0.0065782	0.0723602	0.2170806	18.787395	75.14958	-2.4824093
0.5	5	11	0.1356	0.0978	0.0060636	0.0666996	0.2000988	18.9874938	75.9499752	-2.6066569
0.5	5	11	0.1269	0.0891	0.0055242	0.0607662	0.1822986	19.1697924	76.6791696	-2.7350889
0.5	5	11	0.1177	0.0799	0.0049538	0.0544918	0.1634754	19.3332678	77.3330712	-2.866218
0.5	5	11	0.1173	0.0795	0.004929	0.054219	0.162657	19.4959248	77.9836992	-3.016358
0.5	5	11	0.1097	0.0719	0.0044578	0.0490358	0.1471074	19.6430322	78.5721288	-3.1747798
0.5	5	11	0.1035	0.0657	0.0040734	0.0448074	0.1344222	19.7774544	79.1098176	-3.3453996
0.5	5	11	0.093	0.0552	0.0034224	0.0376464	0.1129392	19.8903936	79.5615744	-3.5153667
0.5	5	11	0.0915	0.0537	0.0033294	0.0366234	0.1098702	20.0002638	80.0010552	-3.7140998
0.5	5	11	0.0871	0.0493	0.0030566	0.0336226	0.1008678	20.1011316	80.4045264	-3.9395486
0.5	5	11	0.0852	0.0474	0.0029388	0.0323268	0.0969804	20.198112	80.792448	-4.2181241
0.5	5	11	0.081	0.0432	0.0026784	0.0294624	0.0883872	20.2864992	81.1459968	-4.5645396
0.5	5	11	0.0769	0.0391	0.0024242	0.0266682	0.0799986	20.3664978	81.4659912	-5.0340622
0.5	5	11	0.0747	0.0369	0.0022878	0.0251658	0.0754974	20.4419852	81.7679808	-5.8676544

Zuata 150C 3 days N2 Date: 2/12/99

10 wt % DBSA/Heptane

20 °C

1 ml/min Absorbance of DBSA/Heptane/Toluene 0.0324
 25 mg calibration factor: 0.032829195 mg/ml

78 mg

95.2 mg

7.8 mg

sample	toluene	dilution factor	read absorbance	real abs	conc., mg/ml	actual conc., mg/ml	asph. Dissolved, mg	Accu. Dissolved,mg	% dissolved	ln(C/Co)
							0	0	0	0
0.5	5	11	0.4482	0.4158	0.013650379	0.150154171	0.450462513	0.450462513	1.80185005	-0.0222188
0.5	5	11	0.5029	0.4705	0.015446136	0.169907497	0.509722492	0.960185005	3.84074002	-0.0479707
0.5	5	11	0.5519	0.5195	0.017054767	0.187602433	0.5628073	1.522992305	6.09196922	-0.0771968
0.5	5	11	0.5144	0.482	0.015823672	0.174060391	0.522181172	2.045173477	8.18069391	-0.1050989
0.5	5	11	0.4653	0.4329	0.014211758	0.156329342	0.468988027	2.514161504	10.056646	-0.1308402
0.5	5	11	0.3862	0.3538	0.011614969	0.12776466	0.38329398	2.897455485	11.5898219	-0.1523814
0.5	5	11	0.3703	0.3379	0.011092985	0.122022834	0.366068502	3.263523987	13.0540959	-0.173397
0.5	5	11	0.3748	0.3424	0.011240716	0.123647879	0.370943637	3.634467624	14.5378705	-0.1951529
0.5	5	11	0.3447	0.3123	0.010252558	0.112778133	0.338334398	3.972802022	15.8912081	-0.2154175
0.5	5	11	0.3121	0.2797	0.009182326	0.101005583	0.30301675	4.275818773	17.1032751	-0.2339221
0.5	5	11	0.2833	0.2509	0.008236845	0.090605295	0.271815884	4.547634657	18.1905386	-0.2508178
0.5	5	11	0.2432	0.2108	0.006920394	0.076124337	0.22837301	4.776007667	19.1040307	-0.2652372
0.5	5	11	0.2341	0.2017	0.006621649	0.072838134	0.218514403	4.994522207	19.9780883	-0.2792315
0.5	5	11	0.2182	0.1858	0.006099664	0.067096308	0.201288925	5.195810995	20.783244	-0.2922983
0.5	5	11	0.1983	0.1659	0.005446363	0.059909997	0.179729992	5.375540987	21.5021639	-0.3041117
0.5	5	11	0.1795	0.1471	0.004829175	0.05312092	0.15936276	5.534903747	22.139615	-0.3147043
0.5	5	11	0.1836	0.1512	0.004963774	0.054601517	0.16380455	5.698708297	22.7948332	-0.3257104
0.5	5	11	0.1695	0.1371	0.004500883	0.049509709	0.148529126	5.847237423	23.3889497	-0.335796
0.5	5	11	0.1521	0.1197	0.003929655	0.043226201	0.129678602	5.976916025	23.9076641	-0.3446855
0.5	5	11	0.1648	0.1324	0.004346585	0.047812439	0.143437318	6.120353343	24.4814134	-0.3546111
0.5	5	11	0.1593	0.1269	0.004166025	0.045826273	0.137478819	6.257832162	25.0313286	-0.3642178
0.5	5	11	0.1536	0.1212	0.003978898	0.043767882	0.131303647	6.389135809	25.5565432	-0.3734799
0.5	5	11	0.1615	0.1291	0.004238249	0.046620739	0.139862218	6.528998028	26.1159921	-0.383441
0.5	5	11	0.1461	0.1137	0.003732679	0.041059474	0.123178422	6.652176449	26.6087058	-0.3922968
0.5	5	11	0.1529	0.1205	0.003955918	0.043515098	0.130545293	6.782721742	27.130887	-0.4017687
0.5	5	11	0.1578	0.1254	0.004116781	0.045284591	0.135853774	6.918575516	27.6743021	-0.4117219
0.5	5	11	0.1493	0.1169	0.003837733	0.042215062	0.126645185	7.045220701	28.1808828	-0.4210905
0.5	5	11	0.1515	0.1191	0.003909957	0.043009528	0.129028584	7.174249285	28.6969971	-0.4307266
0.5	5	11	0.1383	0.1059	0.003476612	0.038242729	0.114728187	7.288977472	29.1559099	-0.4393734
0.5	5	11	0.1498	0.1174	0.003854147	0.042395622	0.127186866	7.416164338	29.6646574	-0.4490473
0.5	5	11	0.1514	0.119	0.003906674	0.042973416	0.128920248	7.545084586	30.1803383	-0.4589496
0.5	5	11	0.1543	0.1219	0.004001879	0.044020667	0.132062002	7.677146587	30.7085863	-0.4691959
0.5	5	11	0.1458	0.1134	0.003722831	0.040951138	0.122853413	7.8	31.2	-0.4788229

120C 1 day air Date: 28/12/99
 % DBSA/Heptane

min Absorbance of DBSA/Heptane/Toluene 0.0354
 25 mg calibration factor : 0.040513285 mg/ml
 75.5 mg
 87.1 mg
 13.4 mg

Sample	toluene	dilution factor	read absorbance	real abs.	conc., mg/ml	actual conc., mg/ml	asph. Dissolved, mg	Accu. Dissolved,mg	% dissolved	ln(C/Co)
							0	0	0	0
5455	5	121	0.1657	0.1303	0.005278881	0.638744608	1.916233825	1.916233825	7.6649353	-0.0986421
5455	5	121	0.1566	0.1212	0.00491021	0.59413543	1.78240629	3.698640114	14.7945605	-0.2000448
5455	5	121	0.1179	0.0825	0.003342346	0.404423869	1.213271608	4.911911722	19.6476469	-0.2754637
5455	5	121	0.0961	0.0607	0.002459156	0.297557926	0.892673777	5.804585499	23.218342	-0.3348275
5455	5	121	0.0795	0.0441	0.001786636	0.216182941	0.648548823	6.453134322	25.8125373	-0.3802801
5	5	11	0.5322	0.4968	0.020127	0.221397001	0.664191003	7.117325325	28.4693013	-0.4290744
5	5	11	0.4672	0.4318	0.017493637	0.192430002	0.577290006	7.694615331	30.7784613	-0.473509
5	5	11	0.4127	0.3773	0.015285662	0.168142287	0.504426862	8.199042193	32.7961688	-0.5140204
5	5	11	0.3671	0.3317	0.013438257	0.147820824	0.443462471	8.642504664	34.5700187	-0.551044
5	5	11	0.3244	0.289	0.011708339	0.128791734	0.386375201	9.028879865	36.1155195	-0.5844581
5	5	11	0.3076	0.2722	0.011027716	0.121304878	0.363914635	9.392794501	37.571178	-0.6169848
5	5	11	0.2912	0.2558	0.010363298	0.113996282	0.341988846	9.734783346	38.9391334	-0.6485472
5	5	11	0.2746	0.2392	0.009690778	0.106598556	0.319795668	10.05457901	40.2183161	-0.6789909
5	5	11	0.2502	0.2148	0.008702254	0.09572479	0.287174371	10.34175338	41.3670135	-0.707142
5	5	11	0.2304	0.195	0.007900091	0.086900997	0.26070299	10.60245637	42.4098255	-0.7334032
5	5	11	0.2371	0.2017	0.00817153	0.089886826	0.269660478	10.87211685	43.4884674	-0.7613123
5	5	11	0.2073	0.1718	0.006964234	0.076606571	0.229819713	11.10193657	44.4077463	-0.7857288
5	5	11	0.2081	0.1727	0.006996644	0.076963088	0.230889264	11.33282583	45.3313033	-0.8108742
5	5	11	0.1824	0.147	0.005955453	0.065509982	0.196529946	11.52935578	46.1174231	-0.8327875
5	5	11	0.1816	0.1462	0.005923042	0.065153465	0.195460396	11.72481617	46.8992647	-0.8550684
5	5	11	0.164	0.1286	0.005210008	0.057310093	0.17193028	11.89674645	47.5869858	-0.875086
5	5	11	0.162	0.1266	0.005128982	0.056418801	0.169256403	12.06600285	48.2640114	-0.8951917
5	5	11	0.1567	0.1213	0.004914261	0.054056876	0.162170629	12.22817348	48.9126939	-0.9148425
5	5	11	0.1446	0.1092	0.004424051	0.048664558	0.145993674	12.37416716	49.4966686	-0.9328895
5	5	11	0.1388	0.1034	0.004189074	0.046079811	0.138239432	12.51240659	50.0496264	-0.9502438
5	5	11	0.1364	0.101	0.004091842	0.04501026	0.13503078	12.64743737	50.5897495	-0.9675115
5	5	11	0.1261	0.0907	0.003674555	0.040420105	0.121260314	12.76869768	51.0747907	-0.9832764
5	5	11	0.1243	0.0889	0.003601631	0.039617942	0.118853825	12.88755151	51.550206	-0.9989735
5	5	11	0.119	0.0836	0.003386911	0.037256017	0.111768051	12.9931956	51.9972782	-1.013963
5	5	11	0.1159	0.0805	0.003261319	0.035874514	0.107623542	13.1069431	52.4277724	-1.0286121
5	5	11	0.1115	0.0761	0.003083061	0.033913671	0.101741013	13.20868411	52.8347365	-1.0426607
5	5	11	0.1089	0.0735	0.002977726	0.032754991	0.098264973	13.30694909	53.2277963	-1.0564193
5	5	11	0.105	0.0696	0.002819725	0.031016971	0.093050913	13.4	53.6	-1.0696248

120C 3 days air Date: 28/12/99
 % DBSA/Heptane

min Absorbance of DBSA/Heptane/Toluene 0.0328
 25 mg calibration factor : 0.023436704 mg/ml
 74 mg
 91.7 mg
 7.3 mg

plate	toluene	dilution factor	read absorbance	real abs.	conc., mg/ml	actual conc., mg/ml	asph	Dissolved, mg	Accu. Dissolved,mg	% dissolved	ln(C/Co)
								0	0	0	0
5	5.03	11.06	0.711	0.6782	0.015894772	0.175796183		0.527388549	0.527388549	2.10955419	-0.0261924
5	5.03	11.06	0.7252	0.6924	0.016227574	0.179476964		0.538430892	1.065819441	4.26327776	-0.0536604
5	5.03	11.06	0.5901	0.5573	0.013061275	0.144457701		0.433373103	1.499192543	5.99677017	-0.0763303
5	5.03	11.06	0.4219	0.3891	0.009119221	0.100858589		0.302575766	1.801768309	7.20707324	-0.0924684
5	5.03	11.06	0.368	0.3352	0.007855983	0.086887173		0.260661518	2.062429827	8.24971931	-0.1065829
5	5.03	11.06	0.3057	0.2729	0.006395876	0.070738393		0.21221518	2.274645007	9.09858003	-0.1182231
5	5.03	11.06	0.274	0.2412	0.005652933	0.062521438		0.187564314	2.462209321	9.84883728	-0.1286252
5	5.03	11.06	0.2483	0.2155	0.00505061	0.055859743		0.167579228	2.629788549	10.5191542	-0.1380114
5	5.03	11.06	0.2957	0.2629	0.006161509	0.068146294		0.204438881	2.83422743	11.3369097	-0.1495826
5	5.03	11.06	0.3377	0.3049	0.007145851	0.079033111		0.237099334	3.071326764	12.2853071	-0.1631724
5	5.03	11.06	0.3587	0.3259	0.007638022	0.08447652		0.253429561	3.324756325	13.2990253	-0.1779052
5	5.03	11.06	0.3818	0.349	0.00817941	0.09046427		0.27139281	3.596149134	14.3845965	-0.1939268
5	5.03	11.06	0.3565	0.3237	0.007586461	0.083906258		0.251718775	3.847867909	15.3914716	-0.20902
5	5.03	11.06	0.3614	0.3286	0.007701301	0.085176387		0.255529161	4.103397071	16.4135883	-0.2245782
5	5.03	11.06	0.3499	0.3171	0.007431779	0.082195473		0.246586418	4.349983489	17.399934	-0.239825
5	5.03	11.06	0.3336	0.3008	0.00704976	0.077970351		0.233911052	4.583894541	18.3355782	-0.2545061
5	5.03	11.06	0.324	0.2912	0.006824768	0.075481935		0.226445806	4.810340346	19.2413614	-0.268927
5	5.03	11.06	0.3116	0.2788	0.006534153	0.072267732		0.216803196	5.027143542	20.1085742	-0.2829315
5	5.03	11.06	0.298	0.2652	0.006215414	0.068742477		0.20622743	5.233370972	20.9334839	-0.2964373
5	5.03	11.06	0.2926	0.2598	0.006088856	0.067342743		0.202028229	5.435399201	21.7415968	-0.3098474
5	5.03	11.06	0.2654	0.2326	0.005451377	0.060292233		0.180876698	5.616275899	22.4651036	-0.322008
5	5.03	11.06	0.2557	0.2229	0.005224041	0.057777896		0.173333688	5.789609587	23.1584383	-0.333802
5	5.03	11.06	0.2446	0.2118	0.004963894	0.054900666		0.164701997	5.954311585	23.8172463	-0.3451389
5	5.03	11.06	0.2287	0.1959	0.00459125	0.050779228		0.152337683	6.106649268	24.4265971	-0.3557405
5	5.03	11.06	0.2218	0.189	0.004429537	0.048990679		0.146972037	6.253621305	25.0144852	-0.3660762
5	5.03	11.06	0.2022	0.1694	0.003970178	0.043910164		0.131730493	6.385351798	25.6414072	-0.3764318
5	5.03	11.06	0.1921	0.1593	0.003733467	0.041292144		0.123876431	6.509228229	26.0369129	-0.3843102
5	5.03	11.06	0.1834	0.1506	0.003529568	0.039037017		0.117111052	6.626339281	26.5053571	-0.3927768
5	5.03	11.06	0.2514	0.2186	0.005123263	0.056663293		0.16998988	6.796329161	27.1853166	-0.4051952
5	5.03	11.06	0.2647	0.2319	0.005434972	0.060110786		0.180332357	6.976661518	27.9066461	-0.41854
5	5.03	11.06	0.2204	0.1876	0.004396726	0.048627785		0.145883356	7.122544874	28.4901795	-0.4294674
5	5.03	11.06	0.1837	0.1509	0.003536599	0.03911478		0.117344341	7.239889214	28.9595569	-0.4383446
5	5.03	11.06	0.1101	0.0773	0.001811657	0.020036929		0.060110786	7.3	29.2	-0.4429227

120C 5 days air Date: 29/12/99
 % DBSA/Heptane

min Absorbance of DBSA/Heptane/Toluene 0.0448
 25 mg calibration factor: 0.020933651 mg/ml
 77.7 mg
 106.7 mg
 4 mg

sample	toluene	dilution factor	read absorbance	real abs	conc., mg/ml	actual conc., mg/ml	asph. Dissolved, mg	Accu Dissolved,mg	% dissolved	In(C/Co)
							0	0	0	0
5455	5	121	0.134	0.0892	0.001867282	0.225941085	0.677823256	0.677823256	2.71129302	-0.0337912
5455	5	121	0.0857	0.0409	0.000856186	0.103598547	0.310795641	0.988618897	3.95447559	-0.0496754
5455	5	121	0.0657	0.0209	0.000437513	0.052939111	0.158817332	1.14743623	4.58974492	-0.0578907
5455	5	121	0.0577	0.0129	0.000270044	0.032675336	0.098026009	1.245462239	4.98184895	-0.0629953
5455	5	121	0.0544	0.0096	0.000200963	0.024316529	0.072949588	1.318411827	5.27364731	-0.066811
5	5	11	0.1607	0.1159	0.00242621	0.026688312	0.080064936	1.398476763	5.59390705	-0.0710158
5	5	11	0.1536	0.1088	0.002277581	0.025053394	0.075160182	1.473636945	5.89454778	-0.0749791
5	5	11	0.1527	0.1079	0.002258741	0.024846151	0.074538452	1.548175397	6.19270159	-0.0789252
5	5	11	0.1521	0.1073	0.002246181	0.024707989	0.074123966	1.622299363	6.48919745	-0.0828649
5	5	11	0.1522	0.1074	0.002248274	0.024731016	0.074193047	1.69649241	6.78596964	-0.0868238
5	5	11	0.1839	0.1391	0.002911871	0.03203058	0.09609174	1.792584149	7.1703366	-0.0919747
5	5	11	0.1706	0.1258	0.002633453	0.028967987	0.08690396	1.879488109	7.51795244	-0.096656
5	5	11	0.1829	0.1381	0.002890937	0.03180031	0.095400929	1.974889039	7.89955615	-0.1018204
5	5	11	0.174	0.1292	0.002704628	0.029750905	0.089252716	2.064141754	8.25656702	-0.1066763
5	5	11	0.1753	0.1305	0.002731841	0.030050256	0.090150769	2.154292524	8.61717009	-0.1116051
5	5	11	0.192	0.1472	0.003081433	0.033895768	0.101687305	2.255979828	9.02391931	-0.1171939
5	5	11	0.179	0.1342	0.002809296	0.030902256	0.092706768	2.348686597	9.39474639	-0.1223165
5	5	11	0.2084	0.1636	0.003424745	0.037672199	0.113016597	2.461703193	9.84681277	-0.128597
5	5	11	0.2042	0.1594	0.003336824	0.036705064	0.110115193	2.571818386	10.2872735	-0.1347545
5	5	11	0.1907	0.1459	0.00305422	0.033596417	0.100789251	2.672607637	10.6904305	-0.1404239
5	5	11	0.2107	0.1659	0.003472893	0.03820182	0.114605461	2.787213098	11.1488524	-0.1469097
5	5	11	0.2283	0.1835	0.003841325	0.042254575	0.126763726	2.913976823	11.6559073	-0.154133
5	5	11	0.2219	0.1771	0.00370735	0.040780846	0.122342538	3.036319362	12.1452774	-0.1611542
5	5	11	0.1949	0.1501	0.003142141	0.034563552	0.103690655	3.140010017	12.5600401	-0.1671438
5	5	11	0.1917	0.1469	0.003075153	0.033826687	0.101480061	3.241490078	12.9659603	-0.1730406
5	5	11	0.1842	0.1394	0.002918151	0.032099661	0.096298983	3.337789061	13.3511562	-0.1786688
5	5	11	0.1982	0.1534	0.003211222	0.035323443	0.10597033	3.443759391	13.7750376	-0.184899
5	5	11	0.1856	0.1408	0.002947458	0.032422039	0.097266117	3.541025508	14.164102	-0.1906518
5	5	11	0.1795	0.1347	0.002819763	0.031017391	0.093052173	3.634077682	14.5363107	-0.1961865
5	5	11	0.1729	0.1281	0.002681601	0.029497608	0.088492824	3.722570506	14.890282	-0.2014786
5	5	11	0.1726	0.1278	0.002675321	0.029428527	0.088285581	3.810856087	15.2434243	-0.2067864
5	5	11	0.171	0.1262	0.002641827	0.029060095	0.087180284	3.898036371	15.5921455	-0.2120555
5	5	11	0.1924	0.1476	0.003089807	0.033987876	0.101963629	4	16	-0.2182536

0.045208	5.03	122.3236	0.3411	0.3087	0.01577539	1.929702463	5.789107389	5.789107389	23.1564296	-0.3337676
0.045208	5.03	122.3236	0.2023	0.1699	0.008682341	1.062055227	3.18616568	8.975273088	35.9010923	-0.5797549
0.045208	5.03	122.3236	0.1225	0.0901	0.004604349	0.563220576	1.689661729	10.6649348	42.6597392	-0.7398006
0.045208	5.03	122.3236	0.1018	0.0694	0.003548524	0.433823618	1.301470854	11.96640565	47.8656226	-0.8833118
0.045208	5.03	122.3236	0.0866	0.0542	0.002769764	0.338807494	1.016422483	12.98282813	51.9313125	-1.0117371
0.5	5.03	11.06	0.4144	0.382	0.019521214	0.215904631	0.647713893	13.63054203	54.5221681	-1.1031139
0.5	5.03	11.06	0.3765	0.3441	0.017584424	0.194483726	0.583451179	14.21399321	56.8559728	-1.1932451
0.5	5.03	11.06	0.3287	0.2963	0.015141717	0.167467388	0.502402163	14.71639537	58.8655815	-1.2779493
0.5	5.03	11.06	0.3082	0.2758	0.014094112	0.155880883	0.467642648	15.18403802	60.7361521	-1.3638114
0.5	5.03	11.06	0.2805	0.2481	0.012678569	0.140224971	0.420674913	15.60471293	62.4188517	-1.4479013
0.5	5.03	11.06	0.2549	0.2225	0.011370341	0.12575597	0.377267909	15.98198084	63.9279234	-1.5298435
0.5	5.03	11.06	0.2515	0.2191	0.011196592	0.123834305	0.371502916	16.35348376	65.413935	-1.6176786
0.5	5.03	11.06	0.2141	0.1817	0.009285352	0.102695999	0.308087996	16.66157175	66.646287	-1.6968696
0.5	5.03	11.06	0.2048	0.1724	0.008810098	0.097439682	0.292319045	16.9538908	67.8155632	-1.7782891
0.5	5.03	11.06	0.1916	0.1592	0.008135543	0.089979103	0.269937308	17.2238281	68.8953124	-1.8598582
0.5	5.03	11.06	0.1731	0.1407	0.007190144	0.079522988	0.238568965	17.46239707	69.8495883	-1.937941
0.5	5.03	11.06	0.1701	0.1377	0.007036836	0.077827402	0.233482207	17.69587928	70.7835171	-2.0207581
0.5	5.03	11.06	0.1624	0.13	0.006643345	0.073475398	0.220426194	17.91630547	71.6652219	-2.1057877
0.5	5.03	11.06	0.1501	0.1177	0.006014783	0.066523495	0.199570485	18.11587596	72.4635038	-2.1895523
0.5	5.03	11.06	0.1434	0.111	0.005672395	0.062736686	0.188210058	18.30408601	73.2163441	-2.2755452
0.5	5.03	11.06	0.1536	0.1212	0.006193642	0.068501679	0.205505036	18.50959105	74.0383642	-2.3787417
0.5	5.03	11.06	0.1396	0.1072	0.005478205	0.060588944	0.181766831	18.69135788	74.7654315	-2.4798359
0.5	5.03	11.06	0.1364	0.104	0.005314676	0.058780318	0.176340955	18.86769884	75.4707953	-2.5887643

150C 3 days air Date 29/12/99
 % DBSA/Heptane

nm Absorbance of DBSA/Heptane/Toluene 0.05
 25 mg calibration factor 0.028379422 mg/ml
 74 mg
 100 mg
 1 mg

plate	toluene	dilution factor	read absorbance	real absa...	conc., mg/ml	actual conc., mg/ml asph	Dissolved, mg	Accu Dissolved,mg	% dissolved	ln(C/Co)
							0	0	0	0
5	6		0.1991	0.1491	0.004231372	0.02538823	0.076164691	0.076164691	0.30465877	-0.0037406
5	6		0.1961	0.1461	0.004148233	0.024877401	0.074632203	0.150796894	0.80318758	-0.0074195
5	6		0.1978	0.1478	0.004194478	0.025166871	0.075500613	0.226297507	0.90519003	-0.011155
5	6		0.1869	0.1389	0.003885143	0.023310857	0.06993257	0.296230078	1.18492031	-0.0146275
5	6		0.1797	0.1297	0.003680811	0.022084866	0.066254597	0.362484675	1.4499387	-0.0179286
5	6		0.1635	0.1135	0.003221064	0.019326386	0.057979158	0.420463833	1.68185533	-0.0208263
5	6		0.1454	0.0954	0.002707397	0.016244381	0.048733143	0.469196976	1.8767879	-0.0232685
5	6		0.1375	0.0875	0.002483199	0.014899196	0.044697589	0.513894565	2.05557826	-0.0255136
5	6		0.1332	0.0832	0.002361168	0.014167007	0.042501022	0.556395586	2.22558235	-0.0276531
5	6		0.1243	0.0743	0.002108591	0.012651546	0.037954638	0.594350225	2.3774009	-0.0295677
5	6		0.1113	0.063	0.001787904	0.010727421	0.032182264	0.626532489	2.50612996	-0.0311939
5	6		0.1135	0.0635	0.001802093	0.01081256	0.032437679	0.658970168	2.63588067	-0.0328357
5	6		0.1068	0.0568	0.001611951	0.009671707	0.028015121	0.687985288	2.75194115	-0.0343066
5	6		0.0993	0.0493	0.001399105	0.008394633	0.025183899	0.713169187	2.85267675	-0.035585
5	6		0.0977	0.0477	0.001353698	0.00812219	0.024366571	0.737535758	2.95014303	-0.0388235
5	6		0.0935	0.0435	0.001234505	0.007407029	0.022221087	0.759756845	3.03902738	-0.0379542
5	6		0.0933	0.0433	0.001228829	0.007372874	0.022118921	0.781875766	3.12750306	-0.0390811
5	6		0.0899	0.0399	0.001132339	0.006794034	0.020382101	0.802257867	3.20903147	-0.0401205
5	6		0.0856	0.0356	0.001010307	0.006061844	0.018185533	0.8204434	3.2817738	-0.0410489
5	6		0.0855	0.0355	0.001007469	0.006044817	0.01813445	0.83857785	3.3543114	-0.0419755
5	6		0.0862	0.0362	0.001027335	0.00616401	0.018492031	0.857069881	3.42827953	-0.0429213
5	6		0.0869	0.0369	0.001047201	0.006283204	0.018849612	0.875919493	3.50367797	-0.0438863
5	6		0.0763	0.0263	0.000746379	0.004478273	0.013434818	0.889354311	3.55741725	-0.0445747
5	6		0.0814	0.0314	0.000891114	0.005346683	0.016040049	0.90539436	3.62157744	-0.0453971
5	6		0.0752	0.0252	0.000715181	0.004290969	0.012872906	0.918267266	3.67306906	-0.0460577
5	6		0.0746	0.0246	0.000698134	0.004188803	0.012566408	0.930833674	3.7233347	-0.0467029
5	6		0.0687	0.0187	0.000530695	0.003184171	0.009552513	0.940386187	3.76154475	-0.0471937
5	6		0.072	0.022	0.000624347	0.003746084	0.011238251	0.951624438	3.80649775	-0.0477714
5	6		0.0708	0.0208	0.000590292	0.003541752	0.010625255	0.962249694	3.84899877	-0.0483178
5	6		0.0677	0.0177	0.000502316	0.003013895	0.009041684	0.971291377	3.88516551	-0.0487831
5	6		0.0694	0.0194	0.000550561	0.003303365	0.009910094	0.981201471	3.92480588	-0.0492933
5	6		0.0703	0.0203	0.000576102	0.003456814	0.010369841	0.991571312	3.96628525	-0.0498275
5	6		0.0665	0.0165	0.00046826	0.002809563	0.008428688	1	4	-0.0502618

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