

<p>COMPONENTS:</p> <p>(1) Biphenyl; C₁₂H₁₀; [92-52-4]</p> <p>(2) Water; H₂O; [7732-18-5]</p>	<p>EVALUATOR:</p> <p>G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia.</p> <p>June 1986.</p>
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CRITICAL EVALUATION:

Quantitative solubility data for biphenyl (1) in water (2) have been reported in the publications listed in Table 1. No data have been reported on the solubility of water in biphenyl.

TABLE 1: Quantitative Solubility Studies of Biphenyl (1) in Water (2)

Reference	T/K	Method
Andrews and Keefer (ref 1)	298	spectrophotometric
Bohon and Claussen (ref 2)	274-316	spectrophotometric
Wauchope and Getzen (ref 4)	273-348	spectrophotometric
Ben-Naim <i>et al.</i> (ref 5)	283-323 ^a	spectrophotometric
Eganhouse and Calder (ref 6)	298	GLC
Mackay and Shiu (ref 7)	298	spectrofluorometric
Banerjee <i>et al.</i> (ref 8)	298	HPLC

^a Solubility on D₂O also reported.

The original data in all of these publications are compiled in the Data Sheets immediately following this Critical Evaluation. In addition Bröllos *et al.* (ref 3) have studied the liquid-liquid phase equilibria in the biphenyl-water system at high temperatures and pressures, and Ben-Naim *et al.* (ref 5) have reported free energies of solution of biphenyl in D₂O.

All the available data on the solubility of biphenyl in water are summarized in Table 2 with the exception of the 298K data of Andrews and Keefer (ref 1) and Banerjee *et al.* (ref 8) which are substantially ($>3\sigma_n$) lower than all other values at this temperature (ref 2,4,6,7) and are therefore rejected. The data of Ben-Naim *et al.* (ref 5) expressed as free energies of solution have also been excluded.

In general the remaining data are in excellent agreement enabling values to be Recommended over a wide range of temperature. The data from Table 2 are also plotted in Figure 1.

(continued next page)

COMPONENTS: (1) Biphenyl; $C_{12}H_{10}$; [92-52-4] (2) Water; H_2O ; [7732-18-5]	EVALUATOR: G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia. June 1986.
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CRITICAL EVALUATION: (continued)

TABLE 2: Recommended (R) and Tentative Values of the Solubility of Biphenyl (1) in Water (2)

T/K	Solubility values		
	Reported values ^a $10^4 g(1)/100g\ sln$	"Best" values ($\pm \sigma_n$) ^b $10^4 g(1)/100g\ sln$	$10^7 x_1$
273	2.80* (ref 2), 2.64 (ref 4)	2.72 ± 0.08 (R)	3.2 (R)
283	4.06 (ref 2)	4.1	4.8
293	6.25* (ref 2)	6.3	7.4
298	7.48 (ref 2), 7.08 (ref 4), 7.45 (ref 6), 7.0 (ref 7)	7.2 ± 0.2 (R)	8.4 (R)
303	9.4* (ref 2), 8.8* (ref 4)	9.1 ± 0.3 (R)	10.6 (R)
313	15.1* (ref 2), 13.7* (ref 4)	14.4 ± 0.7 (R)	16.8 (R)
323	22.0 (ref 4)	22	26
333	37.1* (ref 4)	37	43

^a Values marked with an asterisk (*) were obtained by the Evaluator by graphical interpolation of the original data.

^b Obtained by averaging where appropriate; σ_n has no statistical significance.

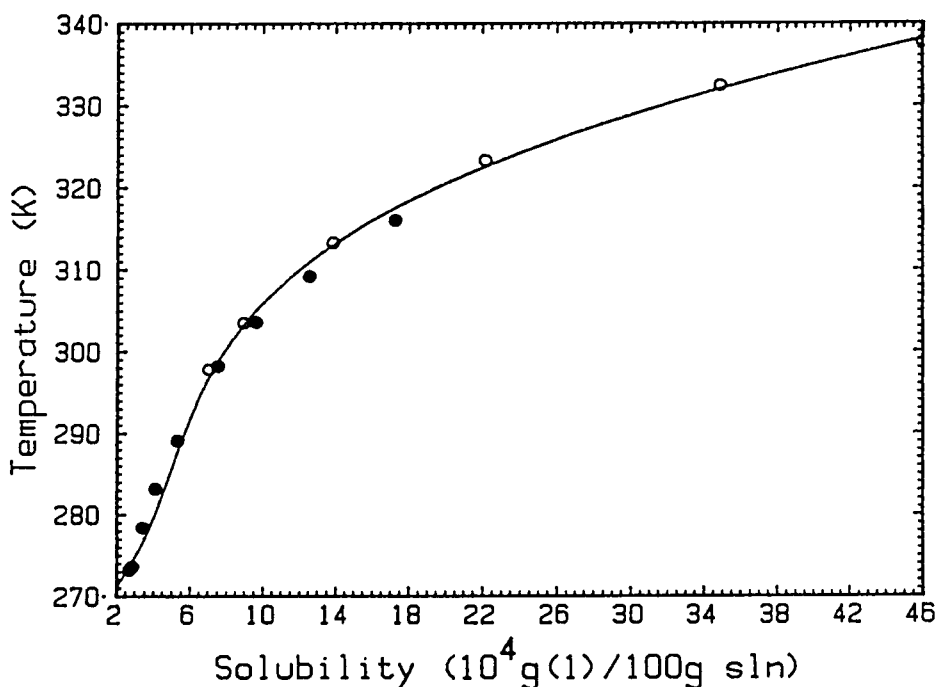


FIGURE 1. Solubility of biphenyl in water, selected data: ref 2(●); ref 4(o). Solid curve fitted through "Best" values (Table 2).

(continued next page)

COMPONENTS:

- (1) Biphenyl; C₁₂H₁₀; [92-52-4]
- (2) Water; H₂O; [7732-18-5]

EVALUATOR:

G.T. Hefter, School of Mathematical and Physical Sciences, Murdoch University, Perth, W.A., Australia.

June 1986.

CRITICAL EVALUATION: (continued)

REFERENCES

1. Andrews, L.J.; Keefer, R.M. *J. Am. Chem. Soc.* 1949, *71*, 3644-7.
2. Bohon, R.L.; Claussen, W.F. *J. Am. Chem. Soc.* 1951, *73*, 1571-8.
3. Bröllos, K.; Peter, K.; Schneider, G.M. *Ber. Bunsenges. Phys. Chem.* 1970, *74*, 682-6.
4. Wauchope, R.D.; Getzen, F.W. *J. Chem. Eng. Data* 1972, *17*, 38-41.
5. Ben-Naim, A.; Wilf, J.; Yaacobi, M. *J. Phys. Chem.* 1973, *77*, 95-102.
6. Eganhouse, R.P.; Calder, J.A. *Geochim. Cosmochim. Acta* 1976, *40*, 555-61.
7. Mackay, D.; Shiu, W.Y. *J. Chem. Eng. Data* 1977, *22*, 399-402.
8. Banerjee, S.; Yalkowski, S.H.; Valvani, S.C. *Environ. Sci. Technol.* 1980, *14*, 1227-9.

ACKNOWLEDGEMENT

The Evaluator thanks Dr Brian Clare for the graphics.

COMPONENTS: (1) Biphenyl; $C_{12}H_{10}$; [92-52-4] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Andrews, L.J.; Keefer, R.M. <i>J. Am. Chem. Soc.</i> <u>1949</u> , <i>71</i> , 3644-77.
VARIABLES: One temperature: 25°C	PREPARED BY: A. Maczynski and Z. Maczynska
EXPERIMENTAL VALUES: <p>The solubility of biphenyl in water at 25°C was reported to be 0.000594 g(1)/100 g sln.</p> <p>The corresponding mole fraction x_1, calculated by the compilers is 6.9×10^{-7}.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: <p>A mixture of (1) and (2) was rotated for twenty hours in a constant temperature bath at 25°C. A sample (5-20 mL) of the aqueous phase was withdrawn and extracted with a measured volume of hexane (10-50 mL) by shaking in a glass-stoppered Erlenmeyer flask. Next, the absorbance of the hexane phase was measured against a hexane blank on the Beckman spectrophotometer.</p>	SOURCE AND PURITY OF MATERIALS: (1) Eastman Kodak Co. best grade; m.p. 70.0-70.5°C; used as received. (2) not specified. ESTIMATED ERROR: not specified. REFERENCES:

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Bohon, R.L.; Claussen, W.F. <i>J. Am. Chem. Soc.</i> <u>1951</u> , 73, 1571-8.
VARIABLES: Temperature: 0.4-42.8°C	PREPARED BY: G.T. Hefter

EXPERIMENTAL VALUES:		
Solubility of biphenyl in water		
$t/^\circ\text{C}$	$10^4 \text{g(1)/100g sln}^a$ (compiler)	$10^7 x_1$ (compiler)
0.4	2.83	3.30
2.4	2.97	3.47
5.2	3.38	3.94
7.6	3.64	4.25
10.0	4.06	4.74
12.6	4.58	5.35
14.9	5.11	5.96
15.9	5.27 ^b	6.15 ^b
25.0	7.48 ^b	8.73 ^b
25.6	7.78	9.08
30.1	9.64	11.2
30.4	9.58	11.2
33.3	11.0	12.8
34.9	11.9	13.9
36.0	12.5	14.6
42.8	17.2	20.1
^a Solubilities of (1) in (2) were reported as "optical density" (absorbance) measurements. Solubilities were calculated by the compiler using the Beer-Lambert law, the stated cell path-length (1 cm) and the authors' "extinction coefficients" (absorptivities) and corrected optical densities. This gave a solubility of g(1)/L sln which was then converted to g(1)/100g sln by assuming a solution density of 1.00 kg/L.		
^b Given in the paper as $7.48 \times 10^{-3} \text{g(1)/L sln}$.		

AUXILIARY INFORMATION

METHOD/APPARATUS/PROCEDURE: A round-bottomed flask containing about 4 mL of (1) and 400 mL of (2) was evacuated, suspended in a thermostat, shaken for 24h and then allowed to settle for at least another 24h. Next, desired quantities of the water layer were syphoned into 6 glass-stoppered Erlenmeyer flasks. These 6 flasks had previously been tared, partially filled with a suitable amount of diluent water, and reweighed. Weighed portions of the samples were inserted into a quartz cuvette and measured in a Beckman DU spectrophotometer. Absorbances were corrected for adsorption of (1) onto the walls of the cuvette.	SOURCE AND PURITY OF MATERIALS: (1) Matheson Co., purified by recrystallization from absolute methanol. (2) Air-free conductivity water, no further details given.
	ESTIMATED ERROR: Temp. $\pm 0.02^\circ\text{C}$ Soly. $\pm 0.5\%$ relative
	REFERENCES:

COMPONENTS:		ORIGINAL MEASUREMENTS:		
(1) Biphenyl; $C_{12}H_{10}$; [92-52-4] (2) Water; H_2O ; [7732-18-5]		Wauchope, R.D.; Getzen, F.W. <i>J. Chem. Eng. Data</i> <u>1972</u> , <i>17</i> , 38-41.		
VARIABLES:		PREPARED BY:		
Temperature: 0-64.5°C		A. Maczynski		
EXPERIMENTAL VALUES:				
Solubility of biphenyl in water				
$t/^\circ C$	mg(1)/kg(2)		10^4 g(1)/100 g sln (compiler)	$10^7 x_1$ (compiler)
	experiment	smoothed with (std dev)		
0.0		2.64 (0.07)	2.64	3.08
24.6	7.13, 7.29, 7.35	6.96	6.96	8.13
25.0		7.08 (0.09)	7.08	8.27
29.9	8.77, 8.64, 8.95	8.73	8.73	10.2
30.3	8.55, 8.54, 8.48	8.88	8.88	10.4
38.4	13.2, 13.3, 13.5	12.7	12.7	14.8
40.1	13.1, 13.4, 13.4	13.8	13.8	16.1
47.5	18.8, 19.0, 18.7	19.5	19.5	22.8
50.0		22.0 (0.2)	22.0	25.7
50.1	20.6, 21.6, 21.8	22.1	22.1	25.8
50.2	20.7, 21.8	22.2	22.2	29.9
54.7	28.3, 28.8, 28.8	27.7	27.7	32.4
59.2	36.4, 36.3, 36.0	34.8	34.8	40.7
60.5	40.4	37.2	37.2	43.5
64.5	43.7, 44.7, 46.6	45.9	45.9	53.6
AUXILIARY INFORMATION				
METHOD/APPARATUS/PROCEDURE:		SOURCE AND PURITY OF MATERIALS:		
<p>Approximately 20 g of (1) was placed in each of three 250-mL glass-stoppered flasks with (2). The flasks were suspended in an open water bath and shaken gently from one to three weeks between measurements. Samples of the replicate were extracted with cyclohexane. In all cases, spectra taken of second extracts or of the aqueous layer after extraction indicated complete extraction. Standard solutions were prepared either by direct weighing using a Cahn electrobalance, or by weighing 0.1-0.2 g of samples followed by serial dilution in calibrated glass-ware.</p>		<p>(1) Baker reagent; recrystallized three times from ether; vacuum-sublimed twice; purity not specified.</p> <p>(2) distilled and deionized.</p>		
		ESTIMATED ERROR:		
		<p>temp. $\pm 0.5^\circ C$ soly. see experimental values above</p>		
		REFERENCES:		

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Ben-Naim, A.; Wilf, J.; Yaacobi, M. <i>J. Phys. Chem.</i> <u>1973</u> , <i>77</i> , 95-102.
VARIABLES: Temperature: 10-50°C (282-323 K)	PREPARED BY: G.T. Hefter
EXPERIMENTAL VALUES: The solubility of biphenyl in water is expressed in terms of the standard free energy of solution, $\Delta\mu_S^0$, determined as: $\Delta\mu_S^0 = \lim_{\rho_S^g \rightarrow 0} [-RT \ln(\rho_S^l/\rho_S^g)_{eq}]$ where $(\rho_S^l/\rho_S^g)_{eq}$ is the Ostwald absorption coefficient and ρ_S^l and ρ_S^g are respectively the molar concentrations of the solute <i>s</i> in the liquid and the gas phase at equilibrium. For the temperature range studied, $\Delta\mu_S^0$ was fitted to a second degree polynomial of the form: $\Delta\mu_S^0 = -14740.4 + 52.057 t - 0.04126 t^2$ where <i>t</i> is in °C (10 < <i>t</i> < 50°C) and $\Delta\mu_S^0$ is in cal/mol (1 cal = 4.184 J). Values of the Ostwald absorption coefficient are also reported.	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Solubilities were determined spectroscopically. Saturated solutions were prepared in two ways: (a) direct mixing of benzene and water for <i>ca.</i> 48 h, (b) dissolution of benzene through the vapor phase. Absorbances of the solutions and their vapors were measured directly at λ_{max} with a Model 450 Perkin-Elmer spectrophotometer with a thermostatted cell holder. Establishment of equilibrium was checked by use of a special three compartment cell, details of which are given in the paper.	SOURCE AND PURITY OF MATERIALS: 1. Fluka; puriss, 99.94%, used as received. 2. Distilled water, further distilled from alk. KMnO ₄ and acid K ₂ Cr ₂ O ₇ ; κ , 0.8 x 10 ⁻⁶ S cm ⁻¹ . ESTIMATED ERROR: Temperature: ±0.05°C Solubility: std. dev. in $\Delta\mu_S^0$, 22.794 cal/mol. REFERENCES:

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Eganhouse, R.P.; Calder, J.A. <i>Geochim. Cosmochim. Acta</i> <u>1976</u> , 40, 555-61.
VARIABLES: One temperature: 25°C	PREPARED BY: A. Maczynski
EXPERIMENTAL VALUES: The solubility of biphenyl in water at 25°C was reported to be 3.47 mg(1)/kg(2) and 4.8×10^{-5} mol(1) dm ⁻³ (2). The corresponding mass percent and mole fraction, x_1 , calculated by the compiler are 7.45×10^{-4} g(1)/100 g sln and 8.70×10^{-7} .	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: A mixture of 500 mL (2) and 0.001 mol (1) was equilibrated in an Erlenmeyer flask for 12 h (agitation) + 24 h (stationary). The saturated solution, 100 mL, was extracted with hexane, concentrated by evaporation under nitrogen and analyzed by glc. A 5700 A Hewlett-Packard instrument equipped with dual compensating columns and flame ionization detectors was employed.	SOURCE AND PURITY OF MATERIALS: (1) source not specified; analytical grade; used as received; no impurities by glc. (2) doubly distilled; free of trace organics. ESTIMATED ERROR: temp. ± 0.5°C soly. ± 0.06 mg(1)/kg(2) (from eight determinations) REFERENCES:

COMPONENTS: (1) Biphenyl; $C_{12}H_{10}$; [92-52-4] (2) Water; H_2O ; [7732-18-5]	ORIGINAL MEASUREMENTS: Mackay, D.; Shiu, W.Y. <i>J. Chem. Eng. Data</i> <u>1977</u> , 22, 399-402.
VARIABLES: One temperature: 25°C	PREPARED BY: M.C. Haulait-Pirson
EXPERIMENTAL VALUES: <p>The solubility of biphenyl in water at 25°C was reported to be 7.0 mg(1) dm^{-3} sln and $x_1 = 8.15 \times 10^{-7}$.</p> <p>The corresponding mass percent calculated by the compiler is 7.0×10^{-4} g(1)/100 g sln.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: A saturated solution of (1) in (2) was vigorously stirred in a 250 mL flask for 24 hrs. and subsequently settled at 25°C for at least 48 hrs. Then the saturated solution was decanted and filtered and 50-100 mL extracted with approximately 5 mL of cyclohexane in a separatory funnel. After shaking for 2 hrs. the cyclohexane extract was removed for analysis. An Aminco-Browman spectrophotofluorometer (American Instruments Ltd.) was used for analysis. Many details are given in the paper.	SOURCE AND PURITY OF MATERIALS: (1) Aldrich Chemicals, Eastman Kodak, or K and K Laboratories, commercial highest grade; used as received. (2) doubly distilled. ESTIMATED ERROR: soly. ± 0.06 mg(1) dm^{-3} sln (maximum deviation from several determinations.) REFERENCES:

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Water; H ₂ O; [7732-18-5]	ORIGINAL MEASUREMENTS: Banerjee, S.; Yalkowsky, S.H.; Valvani, S.C. <i>Environ. Sci. Technol.</i> <u>1980</u> , <i>14</i> , 1227-9.
VARIABLES: One temperature: 25°C	PREPARED BY: G.T. Hefter
EXPERIMENTAL VALUES: The solubility of biphenyl in water was reported to be 3.91×10^{-5} mol/L sln. Assuming a solution density of 1.00 kg/L the corresponding mass per cent and mole fraction, x_1 , solubilities, calculated by the compiler, are 6.03×10^{-4} g(1)/100 g sln and 7.05×10^{-7} .	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Experiments were performed in sealed stainless steel centrifuge tubes. An excess of biphenyl was added to a tube containing distilled water, and the tube was sealed and allowed to equilibrate at $25 \pm 0.2^\circ\text{C}$ with constant or intermittent shaking. Equilibration was generally complete within 1 week. The mixture was then centrifuged at 10,000 rpm for 60 min in a head preequilibrated to $25 \pm 0.3^\circ\text{C}$, following which aliquots of the solution were removed for analysis by high-performance liquid chromatography using a Waters M6000A instrument fitted with a μC_{18} Bondapak column. The mobile phase was a mixture of methanol/water or acetonitrile/water. The entire procedure was carried out at least twice for each compound, and each analysis was also conducted in duplicate.	SOURCE AND PURITY OF MATERIALS: (1) Aldrich; purity not specified. (2) Distilled. ESTIMATED ERROR: Temperature: $\pm 0.2^\circ\text{C}$ Solubility: $\pm 6.0\%$ rel. (representing one std. dev.) REFERENCES:

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Deuterium oxide (Heavy water); D ₂ O; [7789-20-0]	ORIGINAL MEASUREMENTS: Ben-Naim, A.; Wilf, J.; Yaacobi, M. <i>J. Phys. Chem.</i> <u>1973</u> , <i>77</i> , 95-102.
VARIABLES: Temperature: 10-50°C	PREPARED BY: G.T. Hefter
EXPERIMENTAL VALUES: <p>The solubility of biphenyl in heavy water is expressed in terms of the standard free energy of solution, $\Delta\mu_S^0$, determined as:</p> $\Delta\mu_S^0 = \lim_{\rho_S^l \rightarrow 0} [-RT \ln(\rho_S^l/\rho_S^g)_{eq}]$ <p>where $(\rho_S^l/\rho_S^g)_{eq}$ is the Ostwald absorption coefficient and ρ_S^l and ρ_S^g are respectively the molar concentrations of the solute <i>s</i> in the liquid and the gas phase at equilibrium.</p> <p>For the temperature range studied, $\Delta\mu_S^0$ was fitted to a second degree polynomial of the form:</p> $\Delta\mu_S^0 = -12827.6 + 39.059 t - 0.01945 t^2$ <p>where <i>t</i> is in °C (10 < <i>t</i> < 50°C) and $\Delta\mu_S^0$ is in cal/mol (1 cal = 4.184 J).</p> <p>Values of the Ostwald absorption coefficient are also reported.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Solubilities were determined spectroscopically. Saturated solutions were prepared in two ways: (a) direct mixing of benzene and water for ca. 48 h, (b) dissolution of benzene through the vapor phase. Absorbances of the solutions and their vapors were measured directly at λ_{max} with a Model 450 Perkin-Elmer spectrophotometer with a thermostatted cell holder. Establishment of equilibrium was checked by use of a special three compartment cell, details of which are given in the paper.	SOURCE AND PURITY OF MATERIALS: (1) Fluka, puriss, 99.94%, used as received. (2) Fluka, 99.75%, used as received.
ESTIMATED ERROR: Temperature: ±0.05°C Solubility: std. dev. in $\Delta\mu_S^0$, 270.15 cal/mol.	
REFERENCES:	

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Seawater	EVALUATOR: D.G. Shaw Institute of Marine Science University of Alaska Fairbanks, Alaska USA December 1982
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CRITICAL EVALUATION:

The solubility of biphenyl (1) in seawater (2) at 298 K has been reported in two works:

<u>Authors</u>	<u>Method</u>	<u>Salinity g salts/kg sln</u>	<u>10⁴ g(1)/100 g sln</u>
Paul (ref 1)	uv spectral	13-64	6.08 - 3.45
Eganhouse and Calder (ref 2)	GLC	35	4.76

The reported data are all from different salinities which precludes direct comparison. Since the data appear consistent with each other and with the recommended value for the solubility of biphenyl in pure water, the data of Paul and of Eganhouse and Calder are adopted as tentative.

SOLUBILITY OF BIPHENYL (1) IN SEAWATER (2)
TENTATIVE VALUE

<u>T/K</u>	<u>g salts/kg sln</u>	<u>10⁴ g(1)/100 g sln</u>
298	35	4.76

REFERENCES

1. Paul, M.A. *J. Amer. Chem. Soc.* 1952, 74, 5274-7.
2. Eganhouse, R.P.; Calder, J.A. *Geochim. Cosmochim. Acta* 1976, 40, 555-61.

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Sodium chloride; NaCl; [7732-14-5] (3) Water; H ₂ O; [7647-18-5]	ORIGINAL MEASUREMENTS: Paul, M.A. <i>J. Am. Chem. Soc.</i> <u>1952</u> , <i>74</i> , 5274-7.																																								
VARIABLES: One temperature: 25°C Salinity: 13-64 g(3)/kg sln	PREPARED BY: M. Kleinschmidt and W. Shiu																																								
EXPERIMENTAL VALUES: <p style="text-align: center;">Solubility of Biphenyl and Aqueous Sodium Chloride</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">mol(2)/L</th> <th style="text-align: center;">g(2)/kg sln*</th> <th style="text-align: center;">10⁵ mol(1)/L</th> <th style="text-align: center;">10⁴ Mass %*</th> <th style="text-align: center;">10⁷ x₁*</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0.229</td><td style="text-align: center;">13.25</td><td style="text-align: center;">3.98</td><td style="text-align: center;">6.08</td><td style="text-align: center;">7.16</td></tr> <tr><td style="text-align: center;">0.458</td><td style="text-align: center;">26.24</td><td style="text-align: center;">3.61</td><td style="text-align: center;">5.46</td><td style="text-align: center;">6.49</td></tr> <tr><td style="text-align: center;">0.687</td><td style="text-align: center;">39.05</td><td style="text-align: center;">3.08</td><td style="text-align: center;">4.62</td><td style="text-align: center;">5.55</td></tr> <tr><td style="text-align: center;">0.818</td><td style="text-align: center;">46.28</td><td style="text-align: center;">2.79</td><td style="text-align: center;">4.16</td><td style="text-align: center;">5.02</td></tr> <tr><td style="text-align: center;">0.916</td><td style="text-align: center;">51.62</td><td style="text-align: center;">2.78</td><td style="text-align: center;">4.13</td><td style="text-align: center;">5.01</td></tr> <tr><td style="text-align: center;">1.145</td><td style="text-align: center;">63.97</td><td style="text-align: center;">2.40</td><td style="text-align: center;">3.54</td><td style="text-align: center;">4.32</td></tr> <tr><td style="text-align: center;">1.145</td><td style="text-align: center;">63.97</td><td style="text-align: center;">2.34</td><td style="text-align: center;">3.45</td><td style="text-align: center;">4.21</td></tr> </tbody> </table> <p>* Calculated by compilers using density and other physical data for NaCl solutions from ref 1.</p>		mol(2)/L	g(2)/kg sln*	10 ⁵ mol(1)/L	10 ⁴ Mass %*	10 ⁷ x ₁ *	0.229	13.25	3.98	6.08	7.16	0.458	26.24	3.61	5.46	6.49	0.687	39.05	3.08	4.62	5.55	0.818	46.28	2.79	4.16	5.02	0.916	51.62	2.78	4.13	5.01	1.145	63.97	2.40	3.54	4.32	1.145	63.97	2.34	3.45	4.21
mol(2)/L	g(2)/kg sln*	10 ⁵ mol(1)/L	10 ⁴ Mass %*	10 ⁷ x ₁ *																																					
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1.145	63.97	2.40	3.54	4.32																																					
1.145	63.97	2.34	3.45	4.21																																					
AUXILIARY INFORMATION																																									
METHOD/APPARATUS/PROCEDURE: Equilibration flask: 50-mL glass-stoppered flask. The flask was heated in a hot-water bath until the hydrocarbon was melted, then shaken vigorously while cooling until excess hydrocarbon had recrystallized. The flask was then placed into a water bath thermostatically controlled at 25.00 ± 0.05°C for at least 48 hr, and shaken occasionally during that time. Samples were withdrawn with a 10-ml transfer pipet, diluted appropriately and analyzed using a spectrophotometer in the ultra-violet region of the spectrum.	SOURCE AND PURITY OF MATERIALS: (1) recrystallized from menthanol (2) reagent grade, dried at 120°C before weighing (3) redistilled Sources not specified.																																								
	ESTIMATED ERROR: temp. ± 0.05°C soly. ± 2.6 % REFERENCES: 1. Weast, R.C.; <i>CRC Handbook of Chemistry and Physics</i> , 59th Edition; CRC Press <u>1978</u> , pp D299-D300.																																								

COMPONENTS: (1) Biphenyl; C ₁₂ H ₁₀ ; [92-52-4] (2) Artificial seawater (ref 1)	ORIGINAL MEASUREMENTS: Eganhouse, R.P.; Calder, J.A. <i>Geochim. Cosmochim. Acta</i> <u>1976</u> , 40, 555-61.
VARIABLES: One temperature: 25.0°C Salinity: 35 g/kg sln	PREPARED BY: M. Kleinschmidt and W. Shiu
EXPERIMENTAL VALUES: <p>The solubility of biphenyl in seawater is reported to be 4.76 mg/kg. The corresponding mass percent and mole fraction, x_1, calculated by the compilers are 4.76×10^{-4} g(l)/100 g sln and 5.70×10^{-7}.</p> <p>Graphical results for other salinities are also reported.</p>	
AUXILIARY INFORMATION	
METHOD/APPARATUS/PROCEDURE: Equilibrium flask: 1-dm ³ Erlenmeyer flask with ground glass stopper and sidearm tap at base plugged with glass wool. The mixtures were agitated 12+ hr at 215 rpm on a New Brunswick gyrotary shaker; a 24 hr stationary equilibrium period followed. Hydrocarbons were extracted with doubly-distilled hexane 3 times; concentrated by evaporation, with losses checked against an internal standard.	SOURCE AND PURITY OF MATERIALS: (1) analytical grade salts for artificial seawater solution, reagent grade. water: doubly distilled
Analysis: gas chromatography	ESTIMATED ERROR: temperature: $\pm 0.5^\circ\text{C}$ soly: ± 0.293 (95% confidence interval).
	REFERENCES: 1. Lyman, J.; Fleming, R.H.; <i>J. Mar. Res.</i> <u>1940</u> , 3, 135.