# Gas–Liquid Solubilities of Carbon Monoxide, Carbon Dioxide, Hydrogen, Water, 1-Alcohols ($1 \leq n \leq 6$), and $n$-Paraffins ($2 \leq n \leq 6$) in Hexadecane, Octacosane, 1-Hexadecanol, Phenanthrene, and Tetraethylene Glycol at Pressures up to 5.5 MPa and Temperatures from 293 to 553 K

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The gas–liquid solubilities of the solutes carbon monoxide, carbon dioxide, hydrogen, water, ethane, propane, pentane, hexane, methanol, ethanol, 1-propanol, 1-butanol, 1-pentanol, and 1-hexanol in the solvents tetraethylene glycol, hexadecane, octacosane, 1-hexadecanol, and phenanthrene were measured as a function of temperature. The solutes are all reactants or products relevant for synthesis gas conversion into alcohols and/or hydrocarbons. The solvents are seen as potentially attractive for synthesis gas conversion via gas-slurry processes. Experimental conditions varied between 293 and 553 K and 0.06 and 5.5 MPa, covering typical process conditions for synthesis gas conversion. The total set of experimental results consists of 1533 gas–liquid solubilities divided over 60 binary systems. As far as we know hardly any of the gas–liquid solubilities from this set have been reported previously in the literature. Where literature data are available, a comparison is made with our data. This comparison always shows an agreement within the calculated experimental errors with an average deviation of 7.6% and a maximal deviation of 15.0%.

## Introduction

At temperatures between 473 and 673 K and pressures between 2 and 10 MPa, synthesis gas can be converted toward methanol, fuel–methanol (a mixture of methanol and higher alcohols), or a mixture of hydrocarbons (Fischer–Tropsch synthesis), depending on the type of heterogeneous catalyst applied. Gas–solid packed bed reactors are usually applied (*1*, *2*) but new gas-slurry processes gain attention (*3*, *4*). Then the selection of the inert, high-boiling solvent is important, and the magnitude of the gas–liquid solubilities of both the reactants and the products in this liquid can be a crucial criterion.

Experimental data on the solubilities of reactants and products in synthesis gas conversion in such liquids are very scarce in the open literature, particularly at typical synthesis conditions, which involve high pressures and high temperatures. The aim of this study is to measure the solubilities of these reactants and of the major products in several potentially attractive liquid solvents over a wide temperature range.

## Selection of Solutes and Solvents

In the Fischer–Tropsch, the methanol, and the methanol–higher alcohol synthesis, the most relevant components are (1) synthesis gas reactants (carbon monoxide, carbon dioxide, and hydrogen); (2) in methanol synthesis, the product (methanol); (3) in methanol–higher alcohol synthesis, also higher linear and branched alcohols; (4) both in Fischer–Tropsch synthesis and as side products in the methanol–higher alcohol synthesis, linear olefins and paraffins; and (5) the unavoidable side product of synthesis gas conversion (water).

As solutes we selected all the methanol synthesis components (carbon monoxide, carbon dioxide, hydrogen, water, and methanol) and further a set of linear alcohols (ethanol, propanol, 1-butanol, 1-pentanol, and 1-hexanol) and a set of linear paraffins (ethane, propane, pentane, and hexane), representing the most polar and apolar products in synthesis gas conversion, respectively. Solvents were selected on the basis of varying specific properties such as polarizability (phenanthrene), apolarity (hexadecane and octacosane), and polarity (1-hexadecanol and tetraethylene glycol). See Table 1 for the purity and source or origin of the chemicals used in this study.

**Table 1. Purity and Source or Origin of the Chemicals Used in This Study**

| name | formula | source | purity (mass %) |
|---|---|---|---|
| nitrogen | $N_2$ | Hoekloos | >99.995 |
| | Solutes | | |
| hydrogen | $H_2$ | Hoekloos | >99.995 |
| carbon monoxide | CO | Hoekloos | >99 |
| carbon dioxide | $CO_2$ | Hoekloos | >99.9 |
| ethane | $C_2H_6$ | Hoekloos | >99 |
| propane | $C_3H_8$ | Hoekloos | >99.5 |
| pentane | $C_5H_{12}$ | Merck | >99 |
| hexane | $C_6H_{14}$ | Merck | >99 |
| methanol | $CH_3OH$ | Merck | >99.8 |
| ethanol | $C_2H_5OH$ | Merck | >99.8 |
| 1-propanol | $1\text{-}C_3H_7OH$ | Merck | >99.5 |
| 1-butanol | $1\text{-}C_4H_9OH$ | Merck | >99.5 |
| 1-pentanol | $1\text{-}C_5H_{11}OH$ | Merck | >99 |
| 1-hexanol | $1\text{-}C_6H_{13}OH$ | Merck | >98 |
| water, double distilled | $H_2O$ | | >99.9 |
| | Solvents | | |
| tetraethylene glycol | $C_8H_{18}O_5$ | Merck | >97 |
| phenantrene | $C_{10}H_{14}$ | Merck | >98 |
| hexadecane | $C_{16}H_{34}$ | Merck | >99 |
| 1-hexadecanol | $1\text{-}C_{16}H_{33}OH$ | Merck | >97 |
| octacosane | $C_{28}H_{58}$ | Merck | >97 |

## Experimental Section

***Experimental Method.*** The experimental method is similar to that of Olsen (*5*), Cukor and Prausnitz (*6*), and

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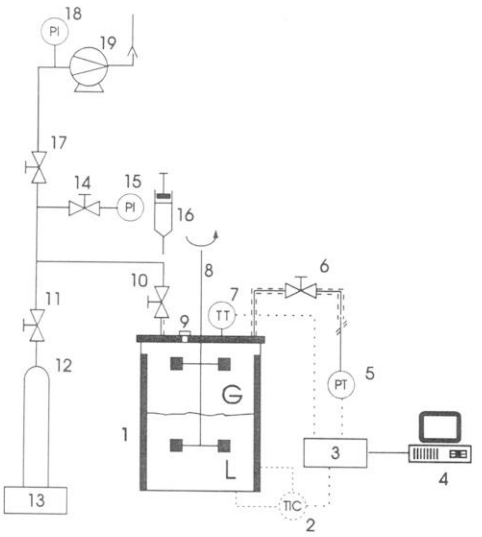


**Figure 1.** Experimental arrangement: (1) stainless steel autoclave, (2) temperature control unit including heating element, (3) interface card, (4) personal computer, (5) low- or high-pressure transmitter, (6) valve, (7) Pt-100 resistance thermometer, (8) magnetic stirring unit, (9) hole, (10) valve, (11) valve, (12) stainless steel supply cylinder, (13) Mettler balance, (14) valve, (15) manometer, (16) syringe, (17) valve, (18) digital pressure indicator, (19) vacuum pump.

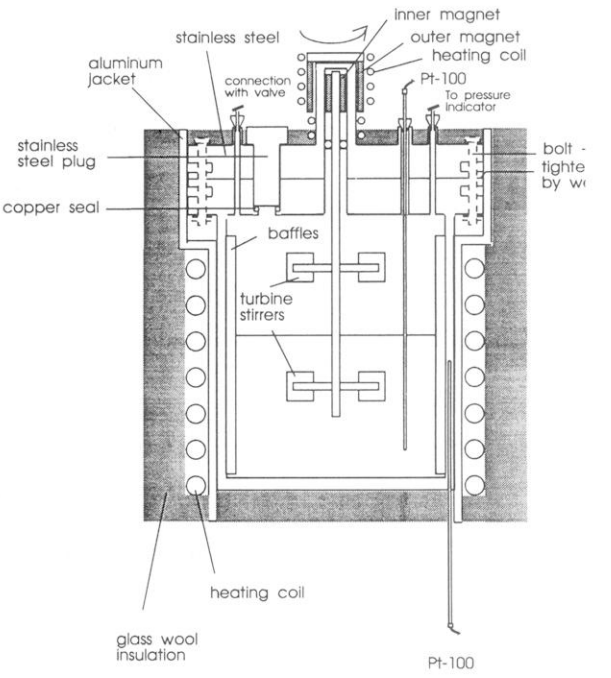


**Figure 2.** Detailed sketch of the autoclave.

Graaf et al. (7). Known amounts of the two components were locked-up in a vessel of known volume. After the temperature was increased stepwise, the system was allowed to reach equilibrium. These equilibria are characterized by a set of primary measured values: $P$, $T$, $V_{sys}(T_0)$, $n_1^T$, and $n_2^T$, where $P$ = pressure (MPa), $T$ = temperature (K), $V_{sys}(T_0)$ = vessel volume ($m^3$) at $T = T_0$ (293 K), $n^T$ is the total number of moles locked-up in the vessel, and 1 and 2 refer to the solute and solvent, respectively. The gas−liquid solubility of component 1 is characterized by the mole fractions of component 1 in the liquid phase and the gas phase, $x_1$ and $y_1$, respectively. These two quantities were calculated indirectly from the primary measured quantities as described below.

***Experimental Arrangement.*** A scheme of the experimental arrangement is given in Figure 1. See Figure 2 for details on the stainless steel autoclave (1), which was magnetically stirred by three six-bladed turbine stirrers placed on a common shaft and provided with four radial baffles, ensuring rapid physical equilibrium between the gas and liquid. At least one stirrer rotated in the liquid. The stirring unit had a very small dead volume of about 10 $cm^3$. To avoid both condensation of the solute in this dead volume and irreversible demagnetizing of the magnets, which occurs at $T > 473$ K, the temperature of the magnet chambers was controlled at 448 K. The temperature inside the autoclave was measured with a Pt-100 resistance thermometer (7) (Tempcontrol, type four-lined Pt-100, range 273−773 K). The Pt-100, including the electronic transducing unit, was calibrated using a standard resistance bank, melting ice, and boiling water. The estimated error of the temperature measurement was ±0.3 K (including reproducibility and systematic effects due to the calibration). The autoclave was further connected to a pressure device with an effective dead volume of 5 $cm^3$. This unit contained either a low- (5) (Druck, type PDCR 910, range 0−1 MPa) or a high-pressure transmitter (5) (Druck, type PDCR 910, range 1−20 MPa), depending on the kind of solute. To ensure an accurate, reproducible pressure measurement, the pressure transmitters were kept at a constant temperature of 293 K. The pressure transmitters, including the electronic transducing units, were calibrated with accurate manometers [15 (Wiegand, type 342.11, 0−16 MPa, class 0.1, inaccuracy ±0.01 MPa) and 18 (Vacuubrand, 0−0.12 MPa, type 220, inaccuracy ±0.0005 MPa)]. The estimated error of the pressure measurement was ±0.0015 MPa for the low- and ±0.015 MPa for the high-pressure transmitter (including reproducibility and systematic effects due to calibration). Condensation of solutes was avoided by separating the pressure transmitter from the gas phase by a seal of silicon oil in a narrow tube (1.6 mm) to minimize the contact surface with the gas phase. By connecting the seal to a small volume of high-pressure carbon dioxide and measuring the pressure as a function of time, it could be experimentally shown that possible inaccuracies by dissolution of the gas in the sealing oil or by evaporation of the sealing oil were negligible. From the top of the autoclave down to about 2 cm below the oil seal the pressure device was thermostated electrically at 473 K to avoid possible condensation of solutes. The autoclave was also connected to a high-pressure, high-temperature valve (10), which could be provided with a septum to inject liquid solutes. To feed gaseous solutes, the valve could be connected to a gas supply cylinder (11−13). The autoclave was electrically heated. To ensure good isothermal conditions, a jacket of aluminum was placed between the autoclave wall and the heating element and both the heating element and the top and bottom of the autoclave were thermally insulated by glass wool. All seals were of either copper or stainless steel (see also Figure 2), and precautions were taken to avoid overheating of the magnets of the stirring unit and the pressure transmitters. Therefore, the experiments could be carried out at relatively high temperatures in the autoclave (up to 553 K in this study) without encountering specific practical problems.

***Estimation of the System Volume.*** The effective system volume was measured at $T_0 = 293$ K by filling the system with a known amount of pure nitrogen and subsequently measuring the pressure increase with a manometer (15). The mass of nitrogen added followed from the differential mass of the supply cylinder (12), $\Delta W_{supply}$, measured with a balance (13) (Mettler, type PC 4400, inaccuracy ±0.01 g per reading). This procedure was

repeated 10 times. The system volume, $V_{sys}(T_0)$, was calculated from the nitrogen mass balance:

$$V_{sys}(T_0) = \frac{RT_0\Delta W_{supply}}{(P_1Z_1^V - P_0Z_0^V)M_{N_2}} \quad (1)$$

where $P_0$, $P_1$ and $Z_0^V$, $Z_1^V$ are the pressures and compressibility factors before and after adding nitrogen, respectively, $M_{N_2}$ is the molar mass of nitrogen, and $R$ is the gas constant (=8.314 J mol$^{-1}$ K$^{-1}$). The compressibility factors $Z_0^V$ and $Z_1^V$ were obtained from *Gas Encyclopaedia* (*8*). The system volume was taken as the average of all measurements to give $V_{sys}(T_0) = (974 \pm 2) \times 10^{-6}$ m$^3$. The error included both reproducibility and systematic effects.

***Measurement of Gas–Liquid Equilibria.*** The clean autoclave was filled with an amount of solvent accurately measured from the differential mass of the autoclave (Mettler balance, type PM 46, inaccuracy ±0.1 g per reading). While stirring, the solvent was degassed with a vacuum pump (19) (valves 10 and 17 open, valves 6 and 14 closed). The degassing was considered to be complete if, after stopping pumping, the pressure increase in time stayed below 4 kPa. The amount of injected liquid solutes was measured from the differential mass of the syringe (Mettler balance, type H10, inaccuracy ±0.0001 g per reading). Gaseous solutes were fed from a supply cylinder (12) (valves 6, 10, 11, and 14 open, valve 17 closed). After valve 10 was closed and stabilization of the pressure as indicated by manometer 15, the amount of solute fed to the autoclave could be accurately calculated from the differential mass of the supply cylinder (balance 13), taking into account the amount of gas entrapped in the volume between valves 10, 11, and 17. The volume of this system (38 cm$^3$) was measured the same way as described above for the vessel volume. The amount of gas entrapped in this section was calculated from the observed pressures before and after feeding the gaseous solutes. For a particular, accurately known, mixture present in the autoclave, a set of experiments with varying temperature was carried out at a rotational stirrer speed of 23.3 rps. Such sets of experiments were run automatically under an in-house-developed Turbo-Pascal computer program. The temperature control of the autoclave (2) and the data acquisition with respect to pressure and temperature were automated using a personal computer (4) linked to the equipment via an interface card (3). The temperature control was realized via a PID algorithm. The set point of the temperature control unit was increased with steps of approximately 5 K. Equilibrium was established at these temperatures and could be detected by the computer program as follows: if five subsequent pressure and temperature measurements, measured within a time interval of at least 10 min, were constant within 0.3 K and 0.001 or 0.01 MPa, for the low-pressure and the high-pressure transmitters, respectively, without showing any trends with time, the gas and liquid were assumed to be in equilibrium. Each measurement within the set of experiments required about 15 min. Equilibrium was established at the highest temperature, the system was cooled stepwise. The measurement method assumes that the system was totally free of leakages. This was verified experimentally by comparing the equilibrium pressures obtained during the heating and the cooling cycles. After a set of experiments was finished, a new set could be carried out by repeating the procedure.

## Calculation of Gas–Liquid Solubilities

In this study the gas–liquid solubility of solute 1 in solvent 2 is expressed as a pseudo Henry constant $H_{12}^{PS}$ at $P^\circ$ = 1.013 bar. The following relation holds for both components at gas–liquid equilibrium:

$$f_i^L = f_i^V \quad (2)$$

Here, the gas-phase fugacity of component $i$, $f_i^V$, follows from

$$f_i^V = \varphi_i^V y_i P \quad (3)$$

where $\varphi_i^V$ = the gas-phase fugacity coefficient of component $i$. In contrast to the gas-phase fugacities, liquid-phase fugacities, $f_i^L$, at constant composition and temperature depend only slightly on the pressure, according to

$$f_i^L(P) = f_i^L(P^\circ)\exp\left(\int_{P^\circ}^{P} \bar{v}_i^L(RT)^{-1}\,dP\right) \quad (4)$$

where $\bar{v}_i^L$ is the partial molar liquid volume of component $i$. For a dilute solution of solute 1 in solvent 2 the liquid-phase fugacity of the solute is usually given by Henry's law:

$$f_1^L = \gamma_1^* x_1 H_{12} \quad \text{with} \quad \lim_{x_1\to 0}(\gamma_1^*) = 1 \quad (5)$$

where $\gamma_1^*$ = the liquid-phase activity coefficient of 1 and $H_{12}$ = the Henry coefficient of solute 1 in solvent 2. Combining eqs 2–5 gives for $H_{12}^{PS}$

$$H_{12}^{PS} = \gamma_{12}^*(P^\circ)H_{12}(P^\circ) = (\varphi_1^V y_1 P/x_1)\exp\left(\int_P^{P^\circ} \bar{v}_i^L(RT)^{-1}\,dP\right) \quad (6)$$

The exponential term is called the Poynting correction (*9*). $\varphi_1^V$ and $\bar{v}_1^L$ were calculated with the Peng–Robinson equation of state (*10*). $x_1$ and $y_1$ were obtained from the primary experimental data at equilibrium ($P$, $T$, $V_{sys}(T_0)$, $n_1^T$, and $n_2^T$) via the next set of equations:

$$x_1 = \frac{n_1^L}{n_1^L + n_2^L} \quad (7)$$

$$y_1 = 1 - y_2 \quad (8)$$

$$n_1^L + n_1^V = n_1^T \quad (9)$$

$$n_2^L + n_2^V = n_2^T \quad (10)$$

$$V^L + V^V = V_{sys}(T_0)[1 + \alpha_{SS}(T - T_0)] \quad (11)$$

$$n_1^V = y_1(PV^V/RTZ^V) \quad (12)$$

$$n_2^V = y_2(PV^V/RTZ^V) \quad (13)$$

$$y_2 = (x_2P_2^s/P)(cf) \quad (14)$$

$$V^L = n_2^L v_2^{\circ L} + n_2^L v_2^{EL} + n_1^L \bar{v}_1^L \quad (15)$$

$$v_2^{\circ L} = [\varrho_2^L(P,T)/M_2]^{-1} \quad (16)$$

$$v_2^{EL} = \bar{v}_2^L|_{PR} - v_2^{\circ L}|_{PR} \quad (17)$$

$$\bar{v}_1^L = \bar{v}_1^L|_{PR} \quad (18)$$

$$Z^V = f(P,T,y_1,y_2) \quad (19)$$

**Table 2. Relevant Physical Properties of the Chemicals Used in This Study: Molecular Weights ($M$), Boiling Points ($T_b$), Critical Properties ($P_c$, $T_c$, $Z_c$), and Acentric Factors ($\omega$) (Values Obtained from Daubert and Danner (13) If Not Noted Otherwise)**

| component | $M$/(kg kmol$^{-1}$) | $T_b$/K | $P_c$/bar | $T_c$/K | $Z_c$ | $\omega$ |
|---|---|---|---|---|---|---|
| $H_2$ | 2.02 | 20.38 | 12.83 | 33.20 | 0.305 | −0.2200 |
| CO | 28.01 | 81.70 | 34.54 | 132.92 | 0.295 | 0.0663 |
| $CO_2$ | 44.01 | 194.80 | 72.87 | 304.19 | 0.274 | 0.2276 |
| $C_2H_6$ | 30.07 | 184.55 | 48.17 | 305.42 | 0.284 | 0.0990 |
| $C_3H_8$ | 44.10 | 231.11 | 41.94 | 369.82 | 0.280 | 0.1517 |
| $C_5H_{12}$ | 72.15 | 309.22 | 33.26 | 469.65 | 0.269 | 0.2486 |
| $C_6H_{14}$ | 86.18 | 341.88 | 29.73 | 507.43 | 0.264 | 0.3047 |
| $CH_3OH$ | 32.04 | 337.85 | 79.92 | 512.58 | 0.224 | 0.5656 |
| $C_2H_5OH$ | 46.07 | 351.44 | 63.02 | 516.25 | 0.248 | 0.6371 |
| 1-$C_3H_7OH$ | 60.10 | 370.35 | 51.04 | 536.71 | 0.253 | 0.6279 |
| 1-$C_4H_9OH$ | 74.12 | 390.81 | 43.56 | 562.93 | 0.259 | 0.5945 |
| 1-$C_5H_{11}OH$ | 88.15 | 410.95 | 38.30 | 586.15 | 0.260 | 0.5938 |
| 1-$C_6H_{13}OH$ | 102.18 | 430.15 | 34.65 | 611.35 | 0.263 | 0.5803 |
| $H_2O$ | 18.02 | 373.15 | 218.07 | 647.29 | 0.233 | 0.3442 |
| $C_8H_{18}O_5$ | 194.23 | 581.00 | 25.57 | 722.00 | 0.243 | 1.5783 |
| $C_{10}H_{14}$ | 178.23 | 613.45 | 28.63 | 869.25 | 0.222 | 0.4858 |
| $C_{16}H_{34}$ | 226.45 | 560.00 | 14.01 | 720.60 | 0.228 | 0.7471 |
| 1-$C_{16}H_{33}OH$ | 242.45 | 617.00[a] | 14.92[b] | 764.18[b] | 0.222[b] | 1.2308[c] |
| $C_{28}H_{58}$ | 394.78 | 704.60[a] | 8.81[b] | 866.20[b] | 0.199[b] | 0.8590[c] |

[a] Estimated with the method of Weast et al. (14). [b] Estimated with the method of Lydersen (15). [c] Estimated with the Lee–Kesler method (16).

$$\mathrm{cf} = \left(\frac{\varphi_2^{\circ V}(P_2^s, T)}{\varphi_2^V}\right) \tag{20}$$

where $V^L$ = the volume of liquid in the vessel, $V^V$ = the volume of gas in the vessel, $\alpha_{SS}$ = the cubic thermal expansion coefficient of stainless steel, i.e., $5.2 \times 10^{-5}$ K$^{-1}$ (12), $Z^V$ = the compressibility factor of the gas phase, $n^L$ = the number of moles in the liquid phase, $n^V$ = the number of moles in the gas phase, $P_2^s$ = the saturated vapor pressure of the pure solvent, cf = the correction factor for nonideal behavior of the gas phase concerning the vapor pressure of the solvent, $v^{\circ L}$ = the molar pure liquid volume, $v_2^{EL}$ = the molar liquid excess volume of the solvent, $\varrho_2^L(P,T)$ = the pure liquid density of the solvent at $P$ and $T$, $M_2$ = the molar mass of the solvent, $|_{PR}$ = calculated with the Peng–Robinson equation of state, $\varphi_2^{\circ V}(P_2^s, T)$ = the gas-phase fugacity coefficient of the pure solvent at $P_2^s$ and $T$, and 1 and 2 refer to the solute and solvent, respectively. In Table 2 the relevant physical properties of the pure components are presented. The liquid density of the solvent at a standard pressure of $P^\circ$ = 1 bar, $\varrho_2^L(P^\circ, T)$, was calculated for hexadecane, tetraethylene glycol, and phenanthrene with an empirical equation from Daubert and Danner (13) and for 1-hexadecanol and octacosane with the method as proposed by Spencer and Danner (17). The liquid density of the solvent at increased pressure, $\varrho_2^L(P,T)$, was calculated via (18)

$$\varrho_2^L(P,T) = \varrho_2^L(P^\circ,T)\left(1 + \frac{9Z_{c,2}N(P - P^\circ)}{P_{c,2}}\right)^{1/9} \tag{21}$$

with $N = (1 - 0.89\omega_2^{1/2})\exp(6.9547 - 76.2853T_{r,2} + 191.306T_{r,2}^2 - 203.5472T_{r,2}^3 + 82.76T_{r,2}^4)$. Here, $Z_c$ = the critical compressibility factor, $P_c$ = the critical pressure, $\omega$ = the acentric factor, and $T_r$ = the reduced temperature. Although eq 21 is for apolar or weakly polar liquids, it could also be used for 1-hexadecanol and tetraethylene glycol without being a serious additional error source (see also below) because the pressure corrections were usually small. For hexadecane, tetraethylene glycol, and phenanthrene the vapor pressure was calculated via an empirical equation from Daubert and Danner (13) and for 1-hexadecanol and octacosane via a method proposed by Riedel (19). The values of $Z^V$, $\varphi_2^{\circ V}$, $\varphi_2^V$, and the molar liquid volumes $v_2^{\circ L}|_{PR}$, $\bar{v}_1^L|_{PR}$, and $\bar{v}_2^L|_{PR}$ were all calculated with the Peng–Robinson equation of state, the latter two numerically by using a finite difference technique with $\Delta n_j^L$ equal to 1% of $n_j^L$. For example, for $v_1^L|_{PR}$

$$v_1^L|_{PR} = \frac{(n_1^L + \Delta n_1^L + n_2^L)v^{L'} - (n_1^L + n_2^L)v^L}{\Delta n_1^L} \tag{22}$$

Here, $v^{L'}$ and $v^L$ are the liquid-phase molar volumes at compositions $(n_1^L + \Delta n_1^L, n_2^L)$ and $(n_1^L, n_2^L)$, respectively. In eqs 6–20, the Peng–Robinson equation of state was used with zero binary interaction coefficients because the values available for these coefficients (11) were not suitable to predict accurately either gas-phase fugacity coefficients or liquid densities. It was checked that using zero binary interaction coefficients did not affect the accuracy of the results. The set of nonlinear equations (7–20) was numerically solved by succesively substituting $x_1$. The updating equation for $x_1$ was taken as follows:

$$x_1^{n+1} = x_1^n + \beta(F(x_1^n) - x_1^n) \tag{23}$$

Here, $F(x_1^n)$ represents the new computed value for $x_1$, with the iterative scheme set up in the form $x_1^{n+1} = F(x_1^n)$. $\beta$ is a relaxation factor to obtain convergency ($0 \le \beta \le 1$). The starting value for $y_1$ was taken as 1, and that for $x_1$ followed by setting $y_1 = 1$, $Z^V = 1$, cf = 1, $v_2^{EL} = 0$, and $\bar{v}_1^L = 0$. The value of the relaxation factor (between 0 and 1) and the number of iterative steps required to match the convergency criterion, i.e., $|x_1^{n+1} - x_1^n| \le 10^{-4}x_1^n$, depended particularly on the nonideality of both the liquid and gas phases.

***Error in $x_1$ and $H_{12}^{PS}$.*** The maximal and average errors in $H_{12}^{PS}$, $ERR_{MAX}^H$, and $ERR_{AV}^H$, respectively, were obtained from the maximal absolute errors of the various error sources as listed in Table 3, via (7)

$$ERR_{MAX}^H = 100\sum_{k=1}^{N_{err}} \frac{\partial H_{12}^{PS}}{\partial v_k} \frac{(\Delta v_k^{sys,rp} + \Delta v_k^{lof})}{H_{12}^{PS}} \tag{24}$$

$$ERR_{AV}^H = 100\left(\sum_{k=1}^{N_{err}} \left(\frac{\partial H_{12}^{PS}}{\partial v_k} \frac{(\Delta v_k^{sys,rp} + \Delta v_k^{lof})}{H_{12}^{PS}}\right)^2\right)^{1/2} \tag{25}$$

where $N_{err}$ = the total number of error-contributing variables, $v$ = an error-contributing variable, for example, $W_1$, $W_2$, etc. (see Table 3), and $\Delta v$ = the absolute error in variable $v$, with sys,rp and lof indicating errors due to systematic and reproducibility effects and due to lack of fit, respectively. For the errors in $x_1$, $ERR_{MAX}^x$ and $ERR_{AV}^x$, the same equations hold with $H_{12}^{PS}$ replaced by $x_1$. For those variables in eqs 24 and 25 which depend on $P$, $T$, $n_1^T$, and/or $n_2^T$ (for example, $y_1$) the value of $\Delta v_k^{sys/rp}$ is estimated via

$$\Delta v_k^{sys,rp} = \frac{\partial v_k}{\partial P}\Delta P + \frac{\partial v_k}{\partial T}\Delta T + \frac{\partial v_k}{\partial n_1^T}\Delta n_1^T + \frac{\partial v_k}{\partial n_2^T}\Delta n_2^T \tag{26}$$

All partial derivatives in eqs 24–26 were calculated numerically with a finite difference technique by varying $v_k$, $P$, $T$, $n_1^T$, or $n_2^T$ by 1%.

## Results and Discussion

***Gas–Liquid Solubilities.*** Gas–liquid solubilities of 60 binaries were measured as a function of temperature. For

**Table 3. Estimated Absolute Values of the Various Errors**

| error source | systematical error and reproducibility | lack of fit | units |
|---|---|---|---|
| $W_1$ | 0.01[a] | | g |
| | 0.0001[a] | | g |
| $W_2$ | 0.5[a] | | g |
| $P$ | 0.15[b] | | bar |
| | 0.015[b] | | bar |
| $T$ | 0.3[b] | | K |
| $P_2^S$ | $g$ | $0.1P_2^S$ [f] | bar |
| $v_1^L$ | $g$ | $0.2v_1^L$ [f] | $m^3\ mol^{-1}$ |
| $v_2^{EL}$ | $g$ | $0.2v_2^{EL}$ [f] | $m^3\ mol^{-1}$ |
| $V_{sys}(T_0)$ | $2 \times 10^{-6}$ [c] | | $m^3$ |
| $Z^V$ | $g$ | $0.015Z^V$ [d] | |
| $v_2^{oL}$ | $g$ | $0.005v_2^{oL}$ [e] | $m^3\ mol^{-1}$ |
| $\varphi_1^V$ | $g$ | $0.005\varphi_1^V$ [d] | |
| | $g$ | $0.002\varphi_1^V$ [d] | |
| | $g$ | $0.010\varphi_1^V$ [d] | |
| | $g$ | $0.015\varphi_1^V$ [d] | |

[a] Estimated from the inaccuracy of the balance (for a differential mass, twice the inaccuracy per reading). [b] Estimated from the results of repeated measurements and the inaccuracy of the calibration equipment. [c] Estimated from the standard deviation of repeated measurements. [d] Estimated by Graaf et al. (7). [e] Estimated from the difference between predicted and experimental data from Spencer and Danner (17). [f] Estimated from the inaccuracies of pure component vapor pressures (5%) and liquid molar volumes (10%) as predicted from the Peng–Robinson equation of state (10). [g] These error sources show neither systematic nor reproducibility errors directly. However, the corresponding values depend on $P$, $T$, and/or composition. So, indirectly errors in these parameters are present as calculated from eq 26.

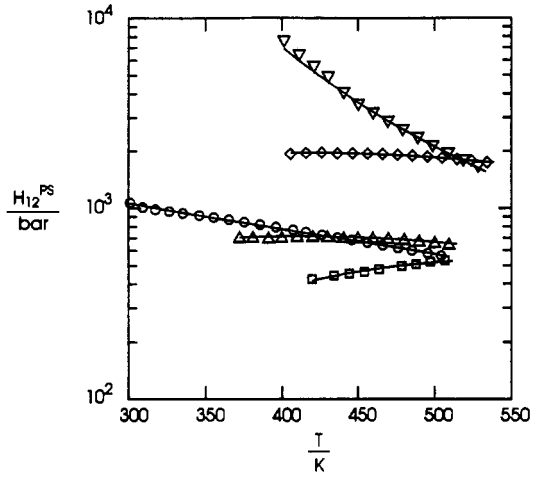


**Figure 3.** Solubility of hydrogen in various solvents as a function of the temperature: (▽) tetraethylene glycol, (◇) phenanthrene, (○) hexadecane, (△) 1-hexadecanol, (□) octacosane, (—) Peng–Robinson equation of state with optimization of two binary interaction parameters; see Breman et al. (11).

the results see the Appendix, Tables A1–A60. As can be seen in the Appendix, both $y_2$ and the Poynting correction (Pntr) were always small. The highest values are 0.19 and 1.203, respectively. Further, even for the binary system with the lowest gas–liquid solubility, the relative fraction of dissolved solute was significant: hydrogen–tetraethylene glycol at $T = 454.9$ K, $n_1^L/n_1^T = 0.16$. Calculations with the Peng–Robinson equation of state, using two optimized binary interaction parameters (11), indicate that $\gamma_1^*$ in eq 5 always deviates less than 10% from 1. As a result, the pseudo Henry coefficient $H_{12}^{PS}$ (see eq 6) deviates less than 10% from the real Henry coefficient $H_{12}$.

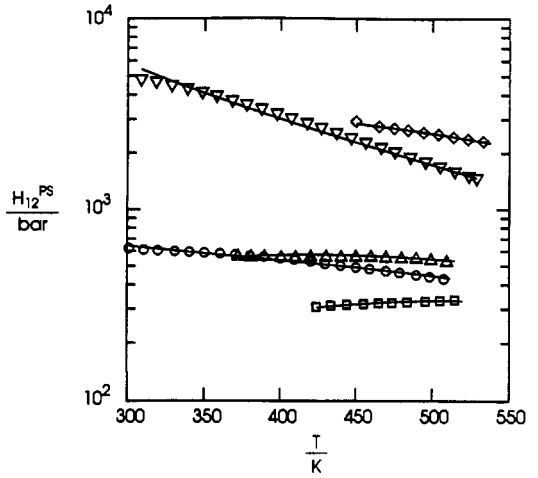


**Figure 4.** Solubility of carbon monoxide in various solvents as a function of the temperature. See Figure 3 for symbols.

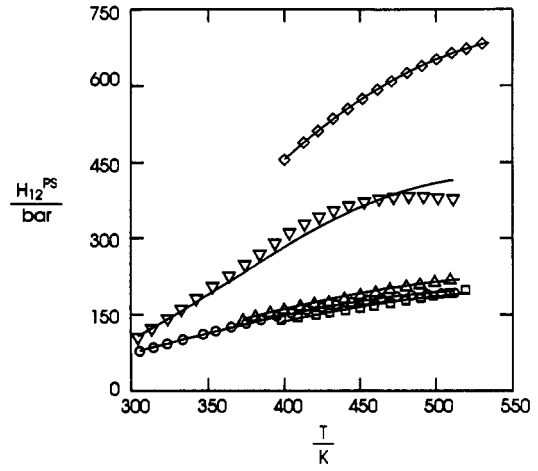


**Figure 5.** Solubility of carbon dioxide in various solvents as a function of the temperature. See Figure 3 for symbols.

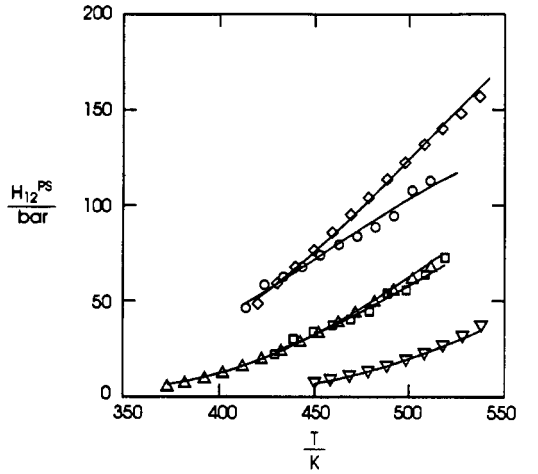


**Figure 6.** Solubility of water in various solvents as a function of the temperature. See Figure 3 for symbols.

$H_{12}^{PS}$ is shown as a function of temperature for each solute in the various solvents in Figures 3–16. The solid line is predicted from the Peng–Robinson equation of state after optimization of two binary interaction parameters (11). For the alcohols, the paraffins, and water the gas–liquid solubilities always decrease with increasing temperature, implying an exothermic dissolving process. In contrast, the small nonpolar solute molecules carbon monoxide and hydrogen dissolve endothermically or just weakly exothermically. This indicates relatively weak

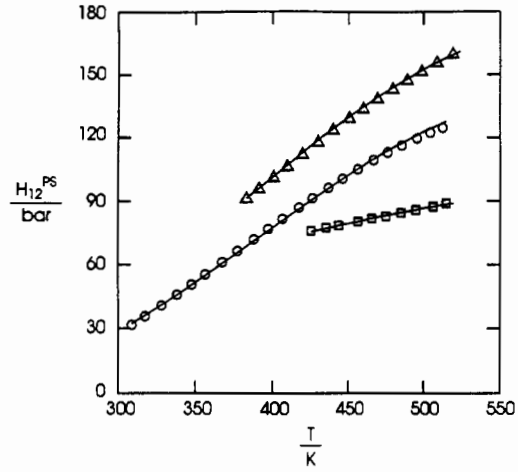


**Figure 7.** Solubility of ethane in various solvents as a function of the temperature. See Figure 3 for symbols.

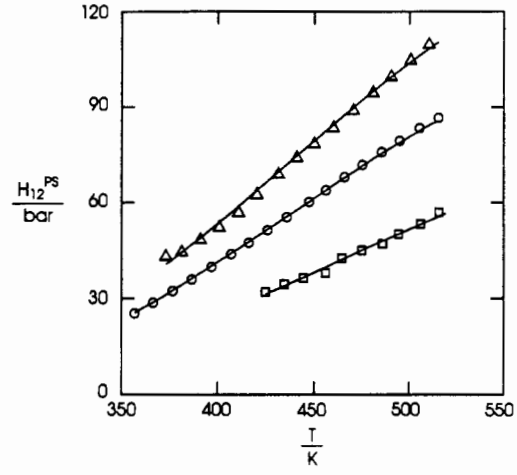


**Figure 8.** Solubility of propane in various solvents as a function of the temperature. See Figure 3 for symbols.

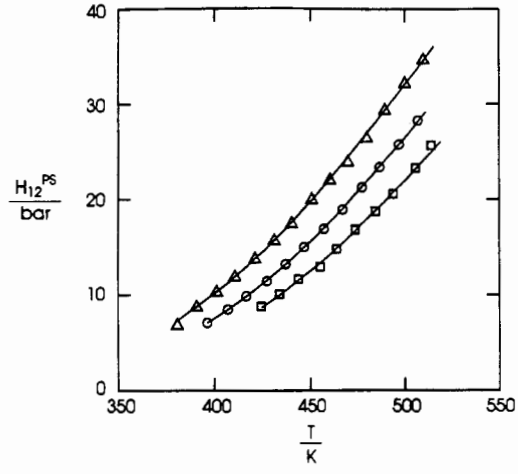


**Figure 9.** Solubility of pentane in various solvents as a function of the temperature. See Figure 3 for symbols.

intermolecular forces between these small molecules and the solvent molecules. For the binary system carbon dioxide–tetraethylene glycol a similar result is observed at high temperatures; see Figure 5. Although water is also a small molecule, obviously its strong polarity guarantees an exothermic dissolving process in all solvents over the whole temperature range.

$$m_{12} = \frac{c_1^L}{c_1^V} = \frac{x_1 v^V}{y_1 v^L} \tag{27}$$

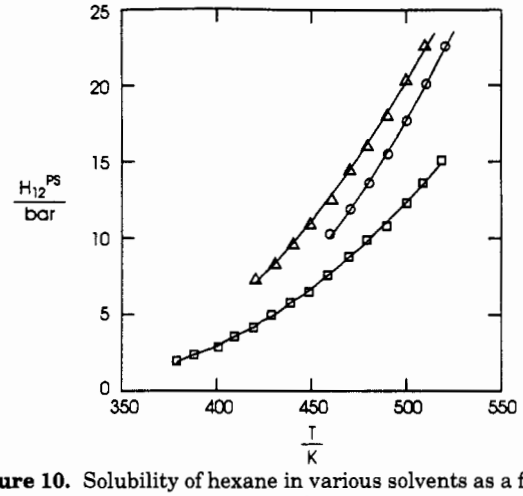


**Figure 10.** Solubility of hexane in various solvents as a function of the temperature. See Figure 3 for symbols.

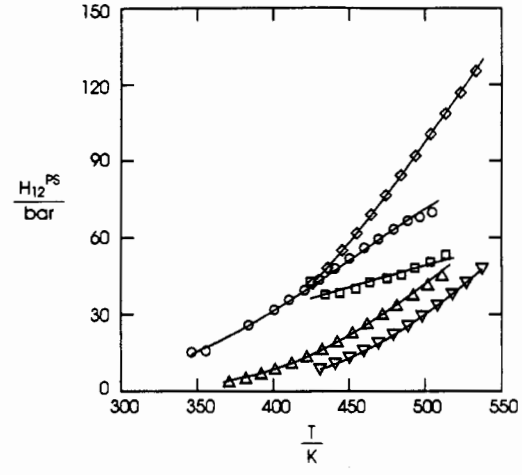


**Figure 11.** Solubility of methanol in various solvents as a function of the temperature. See Figure 3 for symbols.

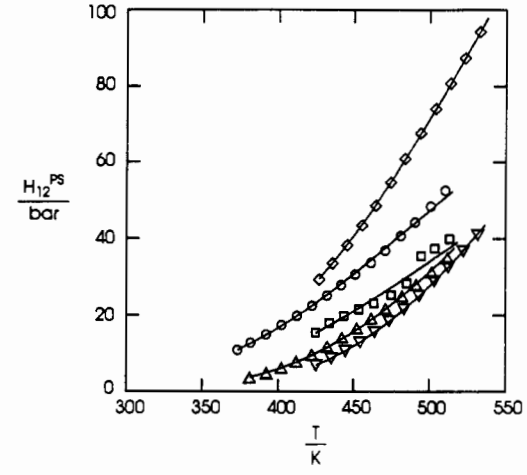


**Figure 12.** Solubility of ethanol in various solvents as a function of the temperature. See Figure 3 for symbols.

Table 4 gives an overview of all experimental $H_{12}^{PS}$ and $m_{12}$ values at 498 K. Here, the gas–liquid solubility $m_{12}$ is defined by

The molar liquid and gas volumes in eq 27 were calculated as discussed above. The tendencies observed at 498 K are rather typical for the whole temperature range. Relative to the corresponding paraffins, the gas–liquid solubilities of the alcohols are always higher. As expected, this relative difference is much larger for a polar solvent such as 1-hexadecanol than for an apolar solvent such as octacosane. For water and the alcohols, tetraethylene glycol

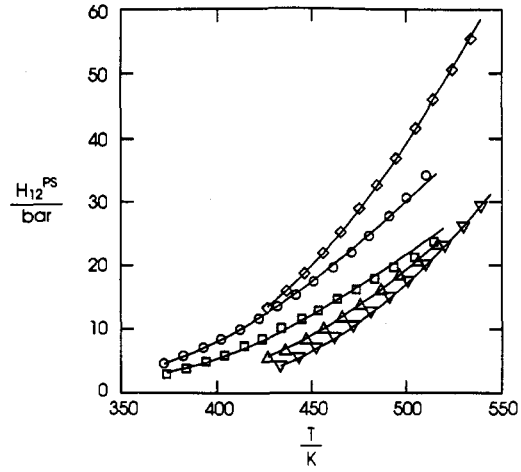


**Figure 13.** Solubility of 1-propanol in various solvents as a function of the temperature. See Figure 3 for symbols.

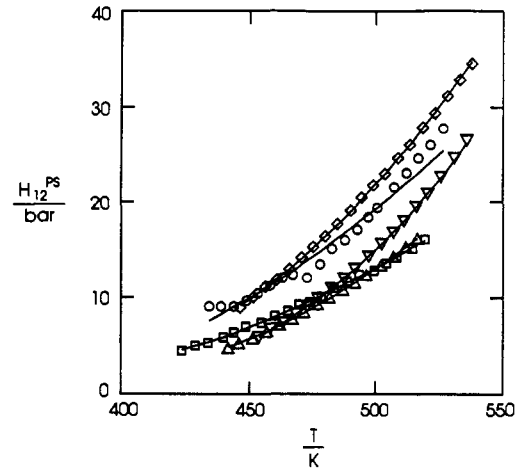


**Figure 14.** Solubility of 1-butanol in various solvents as a function of the temperature. See Figure 3 for symbols.

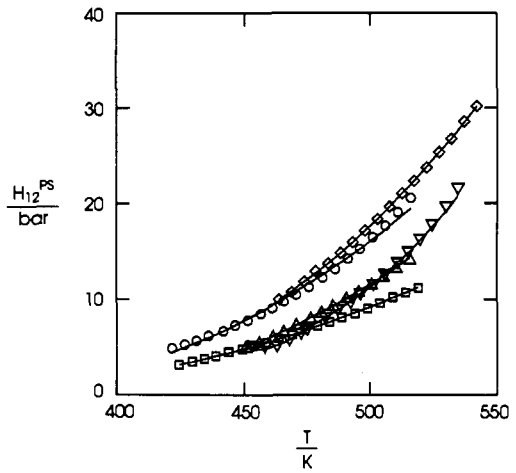


**Figure 15.** Solubility of 1-pentanol in various solvents as a function of the temperature. See Figure 3 for symbols.

clearly is the best solvent. Depending on the carbon number of the solute, either 1-hexadecanol [alcohols ($n \leq 4$) and water] or phenanthrene [alcohols ($n > 4$)] is the second best solvent, whereas octacosane [alcohols ($n \leq 4$)] and hexadecane [water and alcohols ($n > 4$)] are the poorest solvents. For hydrogen, carbon monoxide, carbon dioxide, and the paraffins, hexadecane is the best solvent (measurements in three solvents only) and phenanthrene (carbon dioxide and carbon monoxide) or tetraethylene glycol (hydrogen) is the poorest solvent. The gas–liquid solubilities of carbon dioxide appear to be much more sensitive to

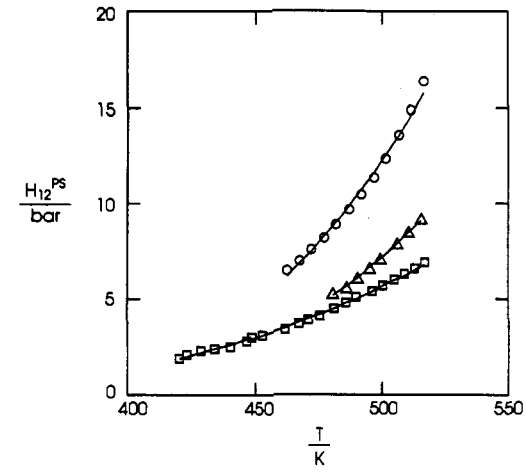


**Figure 16.** Solubility of 1-hexanol in various solvents as a function of the temperature. See Figure 3 for symbols.

**Table 4. Pseudo Henry Constants $H_{12}^{PS}$ (bar) and Solubility Constants $m_{12}$ (Dimensionless) at $T = 498$ K Obtained via Linear Interpolation from the Appendix**

| | | solvent | | | | |
|---|---|---|---|---|---|---|
| solute | | $C_8H_{18}O_5$ | $C_{10}H_{14}$ | $C_{16}H_{34}$ | 1-$C_{16}H_{33}OH$ | $C_{28}H_{58}$ |
| $H_2$ | $H_{12}^{PS}$ | 2139.3 | 1862.2 | 576.6 | 667.0 | 523.8 |
| | $m_{12}$ | 0.092 | 0.122 | 0.197 | 0.178 | 0.137 |
| CO | $H_{12}^{PS}$ | 1738.8 | 2551.8 | 441.7 | 552.1 | 329.8 |
| | $m_{12}$ | 0.113 | 0.089 | 0.257 | 0.214 | 0.217 |
| $CO_2$ | $H_{12}^{PS}$ | 376.7 | 648.7 | 191.4 | 216.6 | 187.3 |
| | $m_{12}$ | 0.520 | 0.351 | 0.592 | 0.547 | 0.383 |
| $C_2H_6$ | $H_{12}^{PS}$ | | | 120.4 | 151.7 | 86.3 |
| | $m_{12}$ | | | 0.916 | 0.781 | 0.831 |
| $C_3H_8$ | $H_{12}^{PS}$ | | | 82.1 | 104.5 | 51.5 |
| | $m_{12}$ | | | 1.323 | 1.133 | 1.392 |
| $C_5H_{12}$ | $H_{12}^{PS}$ | | | 26.1 | 31.8 | 21.9 |
| | $m_{12}$ | | | 4.344 | 3.731 | 3.268 |
| $C_6H_{14}$ | $H_{12}^{PS}$ | | | 17.2 | 20.0 | 12.1 |
| | $m_{12}$ | | | 6.578 | 5.917 | 5.917 |
| $CH_3OH$ | $H_{12}^{PS}$ | 29.1 | 95.7 | 68.4 | 40.2 | 49.5 |
| | $m_{12}$ | 6.757 | 2.387 | 1.661 | 2.950 | 1.449 |
| $C_2H_5OH$ | $H_{12}^{PS}$ | 26.9 | 69.9 | 47.3 | 30.1 | 36.0 |
| | $m_{12}$ | 7.299 | 3.268 | 2.404 | 3.937 | 1.992 |
| 1-$C_3H_7OH$ | $H_{12}^{PS}$ | 16.6 | 38.4 | 30.0 | 18.9 | 20.2 |
| | $m_{12}$ | 11.905 | 5.952 | 3.788 | 6.289 | 3.559 |
| 1-$C_4H_9OH$ | $H_{12}^{PS}$ | 14.5 | 21.5 | 18.7 | 12.7 | 12.7 |
| | $m_{12}$ | 13.513 | 10.638 | 6.098 | 9.346 | 5.650 |
| 1-$C_5H_{11}OH$ | $H_{12}^{PS}$ | 10.8 | 17.2 | 15.8 | 11.3 | 8.9 |
| | $m_{12}$ | 18.182 | 13.333 | 7.194 | 10.526 | 8.064 |
| 1-$C_6H_{13}OH$ | $H_{12}^{PS}$ | | | 11.7 | 6.9 | 5.5 |
| | $m_{12}$ | | | 9.709 | 17.241 | 13.158 |
| $H_2O$ | $H_{12}^{PS}$ | 18.3 | 122.1 | 105.6 | 59.5 | 55.0 |
| | $m_{12}$ | 10.753 | 1.869 | 1.075 | 1.992 | 1.304 |

the chemical nature of the solvent than those of carbon monoxide and hydrogen. This can be understood from the high polarizability of carbon dioxide. The gas–liquid solubilities of carbon monoxide, carbon dioxide, and hydrogen in hexadecane are comparable to those in 1-hexadecanol, indicating a minor influence of the solvent hydroxide group of the latter solvent for these solutes. The gas–liquid solubilities of both the alcohols and water are significantly higher in 1-hexadecanol than in hexadecane whereas the paraffins show the opposite behavior, indicating a significant influence of the solvent hydroxide group of 1-hexadecanol for these solutes. The gas–liquid solubilities in hexadecane and octacosane can differ substantially despite their similar chemical nature. This indicates a

**Table 5. Comparison with Data Available from the Literature**

| solute | solvent | $T$/K | $H_{12}^{PS,LIT}$/bar | $H_{12}^{PS}$/bar | 100(RR)[d] | ref |
|---|---|---|---|---|---|---|
| $CO_2$ | $C_{10}H_{14}$ | 382 | 400.0[a,b] | 420.8[c] | 4.9 | Barrick et al. (*22*) |
| $CO_2$ | $C_{10}H_{14}$ | 423 | 466.0[a,b] | 493.6 | 5.6 | Barrick et al. (*22*) |
| $H_2$ | $C_{16}H_{34}$ | 353 | 902.0[a] | 901.5 | 0.1 | Graaf et al. (*7*) |
| $H_2$ | $C_{16}H_{34}$ | 300 | 1111.0 | 966.0 | 15.0 | Cukor and Prausnitz (*6*) |
| $H_2$ | $C_{16}H_{34}$ | 425 | 681.0 | 729.9 | 6.7 | Cukor and Prausnitz (*16*) |
| $H_2$ | $C_{16}H_{34}$ | 475 | 567.0 | 621.1 | 8.7 | Cukor and Prausnitz (*6*) |
| CO | $C_{16}H_{34}$ | 298 | 567.0[a] | 569.3[c] | 0.4 | Graaf et al. (*7*) |
| CO | $C_{16}H_{34}$ | 353 | 517.0[a] | 590.8 | 12.5 | Graaf et al. (*7*) |
| CO | $C_{16}H_{34}$ | 300 | 538.0 | 566.7[c] | 5.1 | Tremper and Prausnitz (*21*) |
| CO | $C_{16}H_{34}$ | 425 | 461.0 | 521.9 | 11.7 | Temper and Prausnitz (*21*) |
| CO | $C_{16}H_{34}$ | 475 | 419.0 | 466.4 | 10.2 | Temper and Prausnitz (*21*) |
| CO | $C_{16}H_{34}$ | 298 | 570.0 | 569.3[c] | 0.1 | Lin and Parcher (*20*) |
| CO | $C_{16}H_{34}$ | 328 | 543.0 | 603.5 | 10.0 | Lin and Parcher (*20*) |
| $CO_2$ | $C_{16}H_{34}$ | 298 | 74.0 | 66.0[c] | 12.2 | Graaf et al. (*7*) |
| $CO_2$ | $C_{16}H_{34}$ | 353 | 115.0 | 116.4 | 1.2 | Graaf et al. (*7*) |
| $CO_2$ | $C_{16}H_{34}$ | 300 | 74.0 | 67.3[c] | 10.0 | Tremper and Prausnitz (*21*) |
| $CO_2$ | $C_{16}H_{34}$ | 425 | 157.0 | 164.9 | 4.8 | Temper and Prausnitz (*21*) |
| $CO_2$ | $C_{16}H_{34}$ | 475 | 176.0 | 185.6 | 5.2 | Temper and Prausnitz (*21*) |
| $CO_2$ | $C_{16}H_{34}$ | 298 | 71.0 | 66.0[c] | 7.6 | Chai and Paulaitis (*23*) |
| $CO_2$ | $C_{16}H_{34}$ | 330 | 95.0 | 98.0 | 3.1 | Chai and Paulaitis (*23*) |
| $CO_2$ | $C_{16}H_{34}$ | 298 | 73.0 | 66.0 | 10.7 | Lin and Parcher (*20*) |
| $CO_2$ | $C_{16}H_{34}$ | 328 | 92.0 | 96.3 | 4.5 | Lin and Parcher (*20*) |
| $C_5H_{12}$ | $C_{16}H_{34}$ | 320 | 1.3[a,b] | 1.2[c] | 5.0 | Donohue et al. (*24*) |
| $H_2$ | $C_{28}H_{58}$ | 528 | 406.0[a,b] | 488.2[c] | 16.0 | Miller and Ekstrom (*25*) |
| CO | $C_{28}H_{58}$ | 528 | 352.6[a,b] | 307.0[c] | 12.1 | Miller and Ekstrom (*25*) |
| $CO_2$ | $C_{28}H_{58}$ | 353 | 82.0 | 92.4[c] | 11.2 | Lin and Parcher (*20*) |
| $CO_2$ | $C_{28}H_{58}$ | 393 | 101.0 | 115.9[c] | 12.8 | Lin and Parcher (*20*) |
| $C_2H_6$ | $C_{28}H_{58}$ | 393 | 54.0 | 52.8[c] | 2.3 | Lin and Parcher (*20*) |
| $C_3H_8$ | $C_{28}H_{58}$ | 353 | 15.4 | 14.2[c] | 8.8 | Lin and Parcher (*20*) |
| $C_3H_8$ | $C_{28}H_{58}$ | 393 | 24.7 | 22.3[c] | 10.6 | Lin and Parcher (*20*) |

[a] Corrected to $P^\circ$ bar via eq 4. If not noted, no correction was carried out because the exact experimental pressure was not given. [b] Calculated from liquid composition and equilibrium pressure via eq 6 with $y_1$ taken equal to 1. [c] Obtained via the Peng–Robinson equation of state after optimization of two binary interaction parameters; see Breman et al. (*11*). If not noted, obtained via linear interpolation from the Appendix. [d] Defined by $RR = |1 - H_{12}^{PS,LIT}/H_{12}^{PS}|$.

significant influence of the size and/or shape of the solvent molecule on the gas–liquid solubilities. Especially for the small apolar solute molecules hydrogen, carbon monoxide, and carbon dioxide, the gas–liquid solubility is higher in hexadecane than in octacosane, whereas for the other solutes this difference is relatively smaller; see Table 4.

***Comparison with Literature Data.*** Not many gas–liquid solubility data are available for the investigated binary systems. For all the binaries with either an alcohol or water as the solute and/or tetraethylene glycol, 1-hexadecanol, and phenanthrene (except if carbon dioxide is the solute) as the solvent, no comparable measurements were found in the literature. For the other binary systems some results are available. However, these results were nearly always obtained at pressures below or at 1.013 bar, and for a few temperatures only. These limitations usually originate from the experimental methods applied (*20, 21*). The present set of results therefore substantially extends the gas–liquid solubility data bank. It is especially relevant to gas-slurry processes for methanol (–higher alcohol) and hydrocarbon production from synthesis gas. In Table 5 the limited literature results available are compared to our corresponding experimental data. It should be noted that the reported literature values of the pseudo Henry coefficient, $H_{12}^{PS,LIT}$, were generally obtained at another composition of the liquid phase. However, calculations with the Peng–Robinson equation of state suggest that $H_{12}^{PS}$ deviates less than 5% from $H_{12}$ for the binary systems listed in Table 5, allowing a direct comparison between the pseudo Henry coefficients from the literature and this study to be made. As appears from Tables 5 and 6, the agreement between the gas–liquid solubilities from the literature and those from this study is satisfactory, with deviations always within the calculated average experimental errors.

***Experimental Errors.*** For the minimal, maximal, and average calculated values of the average error in $x_1$ ($ERR_{AV}^{x}$) and $H_{12}^{PS}$ ($ERR_{AV}^{H}$) and the maximal values of the maximal error in $x_1$ ($ERR_{MAX}^{x}$) and $H_{12}^{PS}$ ($ERR_{MAX}^{H}$), see Table 6. The maximal values of $ERR_{MAX}^{x}$ and $ERR_{MAX}^{H}$ are higher than the maximal values of $ERR_{AV}^{x}$ and $ERR_{AV}^{H}$ because the first two were calculated from a worst case approach assuming all error sources contributing maximally in the same direction to the overall error, which is very unlikely to occur in practice. The values of $ERR_{AV}^{x}$ and $ERR_{AV}^{H}$ are still overestimated because these are also calculated assuming all the error sources contributing in the same direction to the overall error though not with their maximal quantities but rather with a kind of average quantity, also still unlikely to occur in practice. A high gas–liquid solubility and a relatively large amount of solvent are favorable to obtain accurate results. The first effect is seen from comparing, for example, the errors in the binary systems containing carbon monoxide or hydrogen and the errors in the binary systems containing alcohols. The second effect follows from comparing the errors in binary systems containing hexadecane (±2 mol of solvent) and the binary systems containing octacosane (±0.4 mol of solvent). As far as possible, we used relatively large amounts of solute and solvent.

In Table 7 the relative individual contributions of the several error sources to $ERR_{MAX}^{x}$ and $ERR_{MAX}^{H}$ are shown for some binary systems. Neither for low (represented by carbon monoxide and hydrogen) nor for high gas–liquid solubilities (represented by ethanol and 1-pentanol) can dominating error sources be identified for $ERR_{MAX}^{x}$. Therefore, further improvement of the experimental accuracy in the measurement of temperature, pressure, system volume, or total amounts of solute and solvent will

**Table 6. Minimal, Maximal, and Average Values of the Average Relative Error in $x_1$ ($ERR^x_{AV}$) and $H_{12}^{PS}$ ($ERR^H_{AV}$) and Maximal Values of the Maximal Relative Error in $x_1$ ($ERR^x_{MAX}$) and $H_{12}^{PS}$ ($ERR^H_{MAX}$) for all Binaries**

| | | $ERR^x_{AV}$ | | | $ERR^H_{AV}$ | | | $ERR^x_{MAX}$ | $ERR^H_{MAX}$ |
|---|---|---|---|---|---|---|---|---|---|
| solute | solvent | min | max | av | min | max | av | max | max |
| $H_2$ | $C_8H_{18}O_5$ | 13.18 | 62.17 | 27.66 | 17.96 | 93.47 | 40.09 | 93.97 | 94.08 |
| CO | $C_8H_{18}O_5$ | 8.85 | 43.75 | 21.06 | 11.71 | 68.84 | 30.97 | 67.59 | 70.37 |
| $CO_2$ | $C_8H_{18}O_5$ | 2.15 | 4.90 | 4.13 | 3.49 | 6.24 | 5.45 | 5.94 | 7.77 |
| $CH_3OH$ | $C_8H_{18}O_5$ | 0.21 | 1.23 | 0.56 | 1.67 | 2.19 | 1.77 | 1.45 | 3.66 |
| $C_2H_5OH$ | $C_8H_{18}O_5$ | 0.18 | 0.88 | 0.48 | 1.68 | 1.93 | 1.77 | 1.06 | 3.20 |
| 1-$C_3H_7OH$ | $C_8H_{18}O_5$ | 0.13 | 0.66 | 0.35 | 1.71 | 2.46 | 1.85 | 0.83 | 3.70 |
| 1-$C_4H_9OH$ | $C_8H_{18}O_5$ | 0.16 | 0.59 | 0.34 | 1.72 | 2.04 | 1.80 | 0.75 | 3.22 |
| 1-$C_5H_{11}OH$ | $C_8H_{18}O_5$ | 0.15 | 0.47 | 0.26 | 1.82 | 2.48 | 2.02 | 0.64 | 3.85 |
| $H_2O$ | $C_8H_{18}O_5$ | 0.18 | 0.77 | 0.41 | 1.66 | 1.87 | 1.74 | 0.97 | 3.13 |
| $H_2$ | $C_{10}H_{14}$ | 14.80 | 20.20 | 17.57 | 21.38 | 30.43 | 25.91 | 30.73 | 31.16 |
| CO | $C_{10}H_{14}$ | 14.49 | 21.04 | 17.16 | 20.21 | 30.70 | 24.51 | 30.92 | 31.95 |
| $CO_2$ | $C_{10}H_{14}$ | 5.80 | 6.74 | 6.45 | 7.94 | 8.61 | 8.45 | 8.38 | 10.14 |
| $CH_3OH$ | $C_{10}H_{14}$ | 0.55 | 1.36 | 0.95 | 1.79 | 2.31 | 2.00 | 1.67 | 3.77 |
| $C_2H_7OH$ | $C_{10}H_{14}$ | 0.41 | 1.13 | 0.75 | 1.76 | 2.11 | 1.88 | 1.37 | 3.52 |
| 1-$C_3H_7OH$ | $C_{10}H_{14}$ | 0.21 | 0.74 | 0.45 | 1.74 | 1.99 | 1.81 | 0.91 | 3.27 |
| 1-$C_4H_9OH$ | $C_{10}H_{14}$ | 0.18 | 0.56 | 0.35 | 1.75 | 2.10 | 1.83 | 0.71 | 3.36 |
| 1-$C_5H_{11}OH$ | $C_{10}H_{14}$ | 0.18 | 0.47 | 0.31 | 1.86 | 2.17 | 1.94 | 0.62 | 3.59 |
| $H_2O$ | $C_{10}H_{14}$ | 0.73 | 1.90 | 1.36 | 1.85 | 2.81 | 2.32 | 2.33 | 4.34 |
| $H_2$ | $C_{16}H_{34}$ | 15.03 | 29.49 | 20.53 | 18.50 | 41.98 | 27.41 | 42.59 | 42.69 |
| CO | $C_{16}H_{34}$ | 11.68 | 18.37 | 14.48 | 13.22 | 24.28 | 17.69 | 24.04 | 25.39 |
| $CO_2$ | $C_{16}H_{34}$ | 3.59 | 6.01 | 5.16 | 5.02 | 7.04 | 6.45 | 6.87 | 8.61 |
| $C_2H_6$ | $C_{16}H_{34}$ | 1.69 | 4.56 | 3.33 | 3.60 | 5.60 | 4.62 | 5.33 | 6.60 |
| $C_3H_8$ | $C_{16}H_{34}$ | 0.91 | 2.72 | 2.11 | 2.70 | 4.20 | 3.13 | 3.20 | 4.81 |
| $C_5H_{12}$ | $C_{16}H_{34}$ | 0.27 | 0.90 | 0.56 | 1.80 | 2.09 | 1.87 | 1.09 | 3.32 |
| $C_6H_{14}$ | $C_{16}H_{34}$ | 0.30 | 0.60 | 0.43 | 1.86 | 2.16 | 1.94 | 0.80 | 3.61 |
| $CH_3OH$ | $C_{16}H_{34}$ | 0.44 | 1.37 | 1.01 | 1.99 | 2.33 | 2.16 | 1.76 | 3.78 |
| $C_2H_5OH$ | $C_{16}H_{34}$ | 0.35 | 1.11 | 0.69 | 2.01 | 2.81 | 2.17 | 1.52 | 4.45 |
| 1-$C_3H_7OH$ | $C_{16}H_{34}$ | 0.21 | 0.80 | 0.45 | 1.94 | 4.67 | 2.50 | 1.11 | 6.34 |
| 1-$C_4H_9OH$ | $C_{16}H_{34}$ | 0.25 | 0.63 | 0.39 | 1.86 | 2.45 | 2.08 | 0.84 | 3.92 |
| 1-$C_5H_{11}OH$ | $C_{16}H_{34}$ | 0.22 | 0.53 | 0.29 | 2.13 | 17.75 | 6.57 | 0.83 | 19.63 |
| 1-$C_6H_{13}OH$ | $C_{16}H_{34}$ | 0.32 | 0.51 | 0.36 | 2.76 | 34.86 | 11.82 | 0.88 | 36.97 |
| $H_2O$ | $C_{16}H_{34}$ | 1.09 | 2.19 | 1.69 | 2.19 | 3.20 | 2.72 | 2.83 | 4.78 |
| $H_2$ | 1-$C_{16}H_{33}OH$ | 17.42 | 22.88 | 20.23 | 23.91 | 33.31 | 28.66 | 33.77 | 34.07 |
| CO | 1-$C_{16}H_{33}OH$ | 13.91 | 17.82 | 15.77 | 17.14 | 23.71 | 20.20 | 23.86 | 24.83 |
| $CO_2$ | 1-$C_{16}H_{33}OH$ | 5.78 | 6.89 | 6.41 | 7.90 | 8.63 | 8.36 | 8.48 | 10.28 |
| $C_2H_6$ | 1-$C_{16}H_{33}OH$ | 3.82 | 5.04 | 4.49 | 5.68 | 6.64 | 6.24 | 6.70 | 9.22 |
| $C_3H_8$ | 1-$C_{16}H_{33}OH$ | 2.30 | 3.11 | 2.67 | 5.53 | 6.29 | 5.70 | 4.53 | 8.45 |
| $C_5H_{12}$ | 1-$C_{16}H_{33}OH$ | 0.28 | 0.73 | 0.45 | 2.19 | 5.76 | 3.06 | 1.10 | 7.58 |
| $C_6H_{14}$ | 1-$C_{16}H_{33}OH$ | 0.24 | 0.53 | 0.32 | 2.59 | 11.50 | 4.99 | 0.84 | 13.36 |
| $CH_3OH$ | 1-$C_{16}H_{33}OH$ | 0.23 | 1.23 | 0.65 | 1.97 | 4.86 | 2.43 | 1.66 | 6.56 |
| $C_2H_5OH$ | 1-$C_{16}H_{33}OH$ | 0.20 | 0.98 | 0.50 | 1.96 | 7.27 | 2.80 | 1.34 | 9.01 |
| 1-$C_3H_7OH$ | 1-$C_{16}H_{33}OH$ | 0.28 | 0.66 | 0.42 | 2.40 | 5.40 | 3.21 | 1.03 | 7.32 |
| 1-$C_4H_9OH$ | 1-$C_{16}H_{33}OH$ | 0.22 | 0.50 | 0.28 | 2.61 | 32.98 | 9.86 | 0.79 | 34.92 |
| 1-$C_5H_{11}OH$ | 1-$C_{16}H_{33}OH$ | 0.23 | 0.47 | 0.31 | 2.93 | 10.06 | 4.78 | 0.77 | 12.24 |
| 1-$C_6H_{13}OH$ | 1-$C_{16}H_{33}OH$ | 0.24 | 0.38 | 0.28 | 4.45 | 18.17 | 8.07 | 0.66 | 20.97 |
| $H_2O$ | 1-$C_{16}H_{33}OH$ | 0.31 | 1.63 | 0.85 | 2.14 | 4.64 | 2.61 | 2.28 | 6.44 |
| $H_2$ | $C_{28}H_{58}$ | 57.87 | 69.52 | 65.76 | 77.10 | 106.52 | 94.51 | 101.70 | 107.48 |
| CO | $C_{28}H_{58}$ | 36.08 | 45.44 | 41.12 | 42.59 | 67.24 | 55.58 | 62.61 | 68.69 |
| $CO_2$ | $C_{28}H_{58}$ | 20.31 | 25.31 | 22.53 | 26.81 | 38.85 | 32.70 | 35.58 | 41.02 |
| $C_2H_6$ | $C_{28}H_{58}$ | 10.01 | 10.73 | 10.32 | 12.73 | 15.23 | 13.92 | 14.04 | 17.72 |
| $C_3H_8$ | $C_{28}H_{58}$ | 7.50 | 9.76 | 8.49 | 12.41 | 15.91 | 13.91 | 15.67 | 20.01 |
| $C_5H_{12}$ | $C_{28}H_{58}$ | 1.48 | 3.06 | 2.21 | 3.36 | 4.99 | 4.03 | 4.85 | 7.33 |
| $C_6H_{14}$ | $C_{28}H_{58}$ | 0.67 | 1.79 | 1.10 | 2.88 | 5.58 | 3.41 | 2.90 | 7.91 |
| $CH_3OH$ | $C_{28}H_{58}$ | 5.22 | 6.20 | 5.61 | 8.29 | 9.64 | 8.80 | 9.65 | 12.24 |
| $C_2H_5OH$ | $C_{28}H_{58}$ | 2.06 | 4.52 | 3.21 | 3.37 | 6.28 | 4.71 | 6.18 | 8.21 |
| 1-$C_3H_7OH$ | $C_{28}H_{58}$ | 0.57 | 2.73 | 1.57 | 2.40 | 4.08 | 2.99 | 3.84 | 5.94 |
| 1-$C_4H_9OH$ | $C_{28}H_{58}$ | 0.73 | 1.77 | 1.20 | 2.54 | 3.11 | 2.71 | 2.70 | 5.01 |
| 1-$C_5H_{11}OH$ | $C_{28}H_{58}$ | 0.64 | 1.35 | 0.95 | 2.56 | 3.11 | 2.70 | 2.17 | 5.16 |
| 1-$C_6H_{13}OH$ | $C_{28}H_{58}$ | 0.56 | 0.88 | 0.66 | 2.68 | 9.46 | 4.65 | 1.55 | 11.78 |
| $H_2O$ | $C_{28}H_{58}$ | 1.58 | 7.61 | 5.04 | 3.36 | 11.45 | 7.87 | 11.57 | 13.78 |

reduce the overall value of $ERR^x_{MAX}$ only partially. The total error is relatively strongly influenced by the assumed lack of fit in the calculation of the liquid-phase molar volumes $v_1^L$, $v_2^{EL}$, and $v_2^{\circ L}$ and the gas-phase compressibility factor $Z^V$ if the lack of fit errors are those of Table 3. Then a further improvement in the accuracy of $x_1$ and $H_{12}^{PS}$ requires more accurate methods to predict the gas and liquid densities. In contrast, the influence of the inaccuracies in $P_2^S$ is negligible. For $ERR^H_{MAX}$ the same holds as for $ERR^x_{MAX}$ unless ethanol or 1-pentanol is the solute. In the latter case the experimental inaccuracy of the pressure measurement and the assumed lack of fit in the calculation of the gas-phase fugacity coefficient of the solute are the dominating error sources. Especially at low system pressures, where the relative error in the measured pressure is relatively high, as for the 1-pentanol–hexadecane binary, a further improvement of the accuracy in the pressure measurement will result in a lower $ERR^H_{MAX}$.

## Conclusions

A large set of new gas–liquid solubility data, potentially relevant for synthesis gas conversion into alcohols and hydrocarbons via gas-slurry processes, has been obtained at the high pressures and temperatures relevant for these

**Table 7. Individual Contributions of the Various Error Sources to the Total Error in $x_1$ and $H_{12}^{PS}$ for Four Binary Systems (Averaged over All Data of a Series of Experiments of the Corresponding Binary System)**

| error source | $H_2-C_{16}H_{34}$ | | $CO-C_{16}H_{34}$ | | $C_2H_5OH-C_{16}H_{34}$ | | $1-C_5H_{11}OH-C_{16}H_{34}$ | |
|---|---|---|---|---|---|---|---|---|
| | $ERR^x$ | $ERR^H$ | $ERR^x$ | $ERR^H$ | $ERR^x$ | $ERR^H$ | $ERR^x$ | $ERR^H$ |
| $W_1$ | 13.26 | 13.00 | 1.18 | 1.12 | 1.75 | 0.48 | 1.81 | 0.10 |
| $W_2$ | 3.22 | 3.16 | 3.52 | 3.35 | 13.75 | 3.85 | 26.21 | 1.57 |
| $P$ | 4.15 | 5.23 | 4.97 | 6.85 | 11.80 | 32.44 | 30.02 | 75.93 |
| $T$ | 2.11 | 2.07 | 2.16 | 2.06 | 2.04 | 0.70 | 1.27 | 0.22 |
| $P_2^S$ | 0.00 | 0.01 | 0.01 | 0.01 | 0.87 | 1.83 | 1.83 | 1.81 |
| $\bar{v}_1^L$ | 7.63 | 7.47 | 11.30 | 10.72 | 9.46 | 2.66 | 6.82 | 0.40 |
| $v_2^{EL}$ | 28.37 | 27.77 | 34.65 | 32.17 | 21.36 | 5.98 | 9.81 | 0.58 |
| $V_{sys}(T_0)$ | 8.18 | 8.01 | 8.40 | 8.01 | 7.41 | 2.07 | 4.08 | 0.23 |
| $Z$ | 19.12 | 18.73 | 19.36 | 18.47 | 19.21 | 5.42 | 12.22 | 0.73 |
| $v_2^{\circ L}$ | 13.90 | 13.62 | 14.41 | 13.02 | 12.29 | 3.45 | 6.02 | 0.35 |
| $\varphi_1^V$ | 0.00 | 0.87 | 0.00 | 2.66 | 0.00 | 41.07 | 0.00 | 18.02 |

processes. The experimental arrangement is particularly suitable to obtain gas–liquid solubilities over wide temperature ranges within a relatively short period of time. The accuracy of the results is reasonable as follows from both calculations and a comparison with the few literature results available.

In general, the gas–liquid solubilities decrease with temperature except for some binary systems with carbon monoxide or hydrogen as the solute.

For both water and the alcohols, the strongly polar tetraethylene glycol is the best solvent and the apolar solvents hexadecane and octacosane are the poorest solvents. In contrast, tetraethylene glycol is the poorest solvent for hydrogen and the poorest but one for carbon monoxide, whereas hexadecane and octacosane are relatively good solvents for these solutes.

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## Notation

| | |
|---|---|
| $c$ | concentration, mol $m^{-3}$ |
| $ERR_{AV}^H$ | average error in $H_{12}^{PS}$, bar |
| $ERR_{AV}^x$ | average error in $x_1$ |
| $ERR_{MAX}^H$ | maximal error in $H_{12}^{PS}$, bar |
| $ERR_{MAX}^x$ | maximal error in $x_1$ |
| $f$ | fugacity, bar |
| $H$ | Henry constant, bar |
| $H_{12}^{PS}$ | pseudo Henry constant of solute 1 in solvent 2, eq 6, bar |
| $M$ | molar mass, kg $mol^{-1}$ |
| $m_{12}$ | gas–liquid solubility coefficient of solute 1 in solvent 2, eq 27 |
| $N_{err}$ | number of error-contributing variables |
| $n$ | number of moles or number of carbon atoms |
| $n^T$ | total number of moles |
| $P$ | pressure, bar, MPa, kPa |
| $P_c$ | critical pressure, bar |
| $P^\circ$ | standard pressure, 1 bar |
| $P^s$ | saturated vapor pressure, bar |
| Pntr | Poynting correction |
| $R$ | gas constant, 8.314 J $mol^{-1}$ $K^{-1}$ |
| RR | relative residual |
| $T$ | temperature, K |
| $T_b$ | boiling point, K |
| $T_c$ | critical temperature, K |
| $T_0$ | standard experimental temperature, 293 K |
| $V$ | volume, $m^3$ |
| $V_{sys}(T_0)$ | system volume at $T_0$ = 293 K, $m^3$ |
| $v$ | molar volume, $m^3$ $mol^{-1}$ |
| $\bar{v}^L$ | partial molar liquid volume, $m^3$ $mol^{-1}$ |
| $v_k$ | error-contributing variable |
| $v^{\circ L}$ | molar pure liquid volume, $m^3$ $mol^{-1}$ |
| $W$ | mass of fed component, kg |
| $\Delta W_{supply}$ | differential mass of supply cylinder, kg |
| $x$ | mole fraction in the liquid phase |
| $y$ | mole fraction in the gas phase |
| $Z$ | compressibility factor |
| $Z_c$ | critical compressibility factor |

*Mathematical Notation*

| | |
|---|---|
| $\|x\|$ | absolute value of $x$ |
| $x\|_{PR}$ | $x$ as calculated with the Peng–Robinson equation of state increment of $x$ or absolute error in $x$ |

*Greek Letters*

| | |
|---|---|
| $\alpha_{ss}$ | cubic thermal expansion coefficient of stainless steel, $5.2 \times 10^{-5}$ $K^{-1}$ |
| $\beta$ | relaxation factor, eq 23 |
| $\gamma$, $\gamma^*$ | activity coefficient |
| $\varrho$ | density, kg $m^{-3}$ |
| $\varphi$ | fugacity coefficient |
| $\omega$ | acentric factor |

*Subscripts*

| | |
|---|---|
| $i$ | component $i$ |
| $k$ | control variable |
| $N_2$ | nitrogen |
| PR | calculated with the Peng–Robinson equation of state |
| 1 | component 1, solute |
| 2 | component 2, solvent |

*Superscripts*

| | |
|---|---|
| E | excess |
| L | liquid phase |
| LIT | literature value |
| lof | by lack of fit |
| PS | pseudovalue |
| sys,rp | by systematic and reproducibility effects |
| V | gas or vapor phase |
| ° | pure component |

## Appendix: Experimental Data

The primary experimental measurements were $P$, $T$, the system volume at $T$ = 293 K, and the amount of solute and solvent (here expressed in moles). The system volume at $T$ = 293 K was always $974 \times 10^{-6}$ $m^3$. $x_1$, $y_1$, $H_{12}^{PS}$ were calculated from these primary data as described above. Pntr, the Poynting factor, is defined by

$$\text{Pntr} = \exp\left(\int_{P^\circ}^{P} \bar{v}_1^L (RT)^{-1}\, dP\right)$$

The values of these parameters for 60 binaries are given in Tables A1–A60.

**Table A1.**

solute; $CO_2$: 0.550 (mol)

solvent; $C_8H_{18}O_5$: 3.738 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 10.82 | 304.5 | 0.0988 | 1.0000 | 102.1 | 1.014 |
| 2 | 11.42 | 308.3 | 0.0976 | 1.0000 | 108.8 | 1.015 |
| 3 | 12.29 | 313.6 | 0.0959 | 1.0000 | 119.0 | 1.016 |
| 4 | 13.12 | 318.7 | 0.0943 | 1.0000 | 128.8 | 1.018 |
| 5 | 13.96 | 323.7 | 0.0928 | 1.0000 | 139.0 | 1.019 |
| 6 | 14.73 | 328.4 | 0.0915 | 1.0000 | 148.6 | 1.020 |
| 7 | 15.41 | 332.5 | 0.0904 | 1.0000 | 157.1 | 1.021 |
| 8 | 16.29 | 337.8 | 0.0891 | 1.0000 | 168.4 | 1.022 |
| 9 | 17.06 | 342.1 | 0.0879 | 1.0000 | 178.4 | 1.023 |
| 10 | 17.99 | 347.6 | 0.0866 | 1.0000 | 190.7 | 1.024 |
| 11 | 18.86 | 352.7 | 0.0855 | 1.0000 | 202.5 | 1.025 |
| 12 | 19.62 | 357.3 | 0.0846 | 1.0000 | 212.7 | 1.026 |
| 13 | 20.47 | 363.5 | 0.0839 | 1.0000 | 223.8 | 1.028 |
| 14 | 21.30 | 368.8 | 0.0831 | 1.0000 | 234.8 | 1.029 |
| 15 | 22.09 | 373.8 | 0.0824 | 1.0000 | 245.4 | 1.030 |
| 16 | 22.83 | 378.6 | 0.0819 | 1.0000 | 255.3 | 1.031 |
| 17 | 23.62 | 383.6 | 0.0813 | 1.0000 | 265.9 | 1.032 |
| 18 | 24.38 | 388.4 | 0.0808 | 1.0000 | 276.0 | 1.033 |
| 19 | 25.22 | 393.7 | 0.0803 | 1.0000 | 287.2 | 1.035 |
| 20 | 25.96 | 398.4 | 0.0800 | 1.0000 | 297.0 | 1.036 |
| 21 | 26.74 | 403.3 | 0.0796 | 1.0000 | 307.0 | 1.037 |
| 22 | 27.45 | 408.0 | 0.0794 | 1.0000 | 315.9 | 1.038 |
| 23 | 28.18 | 413.2 | 0.0794 | 1.0000 | 324.6 | 1.039 |
| 24 | 28.83 | 418.3 | 0.0794 | 1.0000 | 331.9 | 1.040 |
| 25 | 29.43 | 422.9 | 0.0796 | 0.9999 | 338.2 | 1.041 |
| 26 | 30.03 | 427.5 | 0.0797 | 0.9999 | 344.5 | 1.042 |
| 27 | 30.67 | 432.6 | 0.0800 | 0.9999 | 350.8 | 1.044 |
| 28 | 31.30 | 438.0 | 0.0803 | 0.9999 | 356.4 | 1.045 |
| 29 | 31.83 | 442.6 | 0.0807 | 0.9998 | 360.7 | 1.046 |
| 30 | 32.39 | 447.7 | 0.0812 | 0.9998 | 365.0 | 1.047 |
| 31 | 32.93 | 452.9 | 0.0818 | 0.9997 | 368.4 | 1.048 |
| 32 | 33.41 | 457.5 | 0.0823 | 0.9996 | 371.4 | 1.050 |
| 33 | 33.91 | 462.6 | 0.0830 | 0.9995 | 373.7 | 1.051 |
| 34 | 34.37 | 467.4 | 0.0837 | 0.9993 | 375.8 | 1.052 |
| 35 | 34.81 | 472.2 | 0.0844 | 0.9992 | 377.2 | 1.053 |
| 36 | 35.26 | 477.0 | 0.0852 | 0.9990 | 378.6 | 1.055 |
| 37 | 35.69 | 482.1 | 0.0861 | 0.9987 | 379.3 | 1.056 |
| 38 | 36.09 | 487.0 | 0.0870 | 0.9984 | 379.3 | 1.057 |
| 39 | 36.44 | 491.9 | 0.0879 | 0.9980 | 378.6 | 1.059 |
| 40 | 36.75 | 497.0 | 0.0890 | 0.9976 | 376.9 | 1.060 |
| 41 | 37.08 | 501.4 | 0.0900 | 0.9972 | 376.2 | 1.061 |
| 42 | 37.22 | 503.5 | 0.0904 | 0.9969 | 375.5 | 1.062 |
| 43 | 37.82 | 511.3 | 0.0921 | 0.9959 | 374.1 | 1.065 |

**Table A2.**

solute; CO: 0.189 (mol)

solvent; $C_8H_{18}O_5$: 4.011 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 16.25 | 308.5 | 0.0033 | 1.0000 | 4725.7 | 1.022 |
| 2 | 16.58 | 313.3 | 0.0034 | 1.0000 | 4678.4 | 1.022 |
| 3 | 16.92 | 318.2 | 0.0036 | 1.0000 | 4611.7 | 1.023 |
| 4 | 17.27 | 323.1 | 0.0037 | 1.0000 | 4564.3 | 1.023 |
| 5 | 17.62 | 328.3 | 0.0039 | 1.0000 | 4423.1 | 1.024 |
| 6 | 17.98 | 333.3 | 0.0040 | 1.0000 | 4349.8 | 1.024 |
| 7 | 18.36 | 338.6 | 0.0042 | 1.0000 | 4256.2 | 1.024 |
| 8 | 18.68 | 343.1 | 0.0044 | 1.0000 | 4163.3 | 1.025 |
| 9 | 19.05 | 348.2 | 0.0046 | 1.0000 | 4075.2 | 1.025 |
| 10 | 19.38 | 352.6 | 0.0047 | 1.0000 | 4019.1 | 1.026 |
| 11 | 19.75 | 357.7 | 0.0049 | 1.0000 | 3903.1 | 1.026 |
| 12 | 20.12 | 362.9 | 0.0052 | 1.0000 | 3794.4 | 1.027 |
| 13 | 20.50 | 368.0 | 0.0054 | 1.0000 | 3701.1 | 1.027 |
| 14 | 20.83 | 372.5 | 0.0056 | 1.0000 | 3591.6 | 1.028 |
| 15 | 21.22 | 377.5 | 0.0058 | 1.0000 | 3531.4 | 1.029 |
| 16 | 21.59 | 382.5 | 0.0061 | 1.0000 | 3425.7 | 1.029 |
| 17 | 21.98 | 387.4 | 0.0064 | 1.0000 | 3350.8 | 1.030 |
| 18 | 22.36 | 392.6 | 0.0067 | 1.0000 | 3244.5 | 1.030 |
| 19 | 22.74 | 397.6 | 0.0070 | 1.0000 | 3157.9 | 1.031 |
| 20 | 23.10 | 402.0 | 0.0073 | 1.0000 | 3087.2 | 1.032 |
| 21 | 23.48 | 407.1 | 0.0076 | 1.0000 | 2992.8 | 1.032 |
| 22 | 23.90 | 412.5 | 0.0080 | 1.0000 | 2899.2 | 1.033 |
| 23 | 24.29 | 417.4 | 0.0084 | 1.0000 | 2824.6 | 1.034 |
| 24 | 24.65 | 422.0 | 0.0087 | 1.0000 | 2746.3 | 1.035 |
| 25 | 25.03 | 426.8 | 0.0091 | 0.9999 | 2671.1 | 1.036 |
| 26 | 25.41 | 431.7 | 0.0095 | 0.9999 | 2590.1 | 1.036 |
| 27 | 25.83 | 436.8 | 0.0100 | 0.9999 | 2516.0 | 1.037 |
| 28 | 26.21 | 441.7 | 0.0104 | 0.9999 | 2442.3 | 1.038 |
| 29 | 26.60 | 446.6 | 0.0109 | 0.9998 | 2370.3 | 1.039 |
| 30 | 26.99 | 451.4 | 0.0113 | 0.9998 | 2306.3 | 1.040 |
| 31 | 27.39 | 456.2 | 0.0118 | 0.9997 | 2244.0 | 1.041 |
| 32 | 27.80 | 461.3 | 0.0124 | 0.9996 | 2174.8 | 1.042 |
| 33 | 28.21 | 466.3 | 0.0129 | 0.9995 | 2109.4 | 1.043 |
| 34 | 28.56 | 470.6 | 0.0134 | 0.9994 | 2054.2 | 1.044 |
| 35 | 28.95 | 475.3 | 0.0140 | 0.9992 | 1998.8 | 1.045 |
| 36 | 29.38 | 480.4 | 0.0146 | 0.9990 | 1937.6 | 1.047 |
| 37 | 29.79 | 485.5 | 0.0153 | 0.9988 | 1876.6 | 1.048 |
| 38 | 30.23 | 490.5 | 0.0159 | 0.9985 | 1822.9 | 1.050 |
| 39 | 30.61 | 495.4 | 0.0166 | 0.9981 | 1765.8 | 1.051 |
| 40 | 31.03 | 500.3 | 0.0173 | 0.9977 | 1714.9 | 1.053 |
| 41 | 31.45 | 505.0 | 0.0180 | 0.9972 | 1668.0 | 1.054 |
| 42 | 31.87 | 510.0 | 0.0188 | 0.9966 | 1616.1 | 1.056 |
| 43 | 32.27 | 514.6 | 0.0195 | 0.9960 | 1570.9 | 1.058 |
| 44 | 32.74 | 519.6 | 0.0204 | 0.9952 | 1526.3 | 1.060 |
| 45 | 33.11 | 523.7 | 0.0211 | 0.9944 | 1487.6 | 1.061 |
| 46 | 33.54 | 528.3 | 0.0219 | 0.9934 | 1447.4 | 1.064 |
| 47 | 33.60 | 528.8 | 0.0220 | 0.9933 | 1444.6 | 1.064 |

**Table A3.**

solute; $H_2$: 0.362 (mol)

solvent; $C_8H_{18}O_5$: 3.918 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 45.72 | 401.4 | 0.0058 | 1.0000 | 7527.7 | 1.052 |
| 2 | 46.46 | 406.3 | 0.0065 | 1.0000 | 6899.7 | 1.054 |
| 3 | 47.19 | 411.3 | 0.0071 | 1.0000 | 6355.8 | 1.055 |
| 4 | 47.97 | 416.3 | 0.0078 | 1.0000 | 5887.8 | 1.056 |
| 5 | 48.71 | 421.0 | 0.0085 | 1.0000 | 5516.4 | 1.058 |
| 6 | 49.50 | 426.0 | 0.0092 | 1.0000 | 5177.8 | 1.059 |
| 7 | 50.16 | 430.4 | 0.0099 | 1.0000 | 4867.1 | 1.061 |
| 8 | 50.83 | 435.5 | 0.0109 | 0.9999 | 4462.2 | 1.062 |
| 9 | 51.36 | 440.6 | 0.0122 | 0.9999 | 4022.0 | 1.063 |
| 10 | 51.82 | 445.3 | 0.0134 | 0.9999 | 3683.1 | 1.065 |
| 11 | 52.57 | 450.2 | 0.0143 | 0.9999 | 3492.3 | 1.066 |
| 12 | 53.28 | 454.9 | 0.0152 | 0.9998 | 3325.0 | 1.068 |
| 13 | 54.05 | 459.9 | 0.0163 | 0.9998 | 3153.2 | 1.070 |
| 14 | 54.76 | 464.7 | 0.0173 | 0.9997 | 2998.5 | 1.072 |
| 15 | 55.45 | 469.5 | 0.0184 | 0.9997 | 2849.9 | 1.074 |
| 16 | 56.14 | 474.4 | 0.0196 | 0.9996 | 2705.7 | 1.076 |
| 17 | 56.87 | 479.3 | 0.0208 | 0.9995 | 2575.0 | 1.078 |
| 18 | 57.54 | 483.9 | 0.0220 | 0.9993 | 2462.5 | 1.080 |
| 19 | 58.25 | 489.0 | 0.0233 | 0.9992 | 2341.4 | 1.083 |
| 20 | 58.90 | 493.9 | 0.0248 | 0.9990 | 2225.7 | 1.085 |
| 21 | 59.58 | 498.8 | 0.0262 | 0.9988 | 2122.5 | 1.087 |
| 22 | 60.28 | 503.8 | 0.0277 | 0.9985 | 2027.3 | 1.090 |
| 23 | 61.04 | 508.9 | 0.0292 | 0.9982 | 1940.5 | 1.093 |
| 24 | 61.69 | 513.6 | 0.0307 | 0.9978 | 1857.5 | 1.096 |
| 25 | 62.44 | 518.7 | 0.0324 | 0.9973 | 1778.2 | 1.099 |
| 26 | 63.21 | 523.6 | 0.0340 | 0.9968 | 1710.2 | 1.103 |
| 27 | 64.08 | 528.4 | 0.0355 | 0.9962 | 1651.7 | 1.106 |
| 28 | 65.04 | 533.5 | 0.0372 | 0.9955 | 1594.3 | 1.111 |

**Table A4.**

solute; $CH_3OH$: 0.695 (mol)

solvent; $C_8H_{18}O_5$: 2.590 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.80 | 430.7 | 0.2060 | 0.9994 | 8.6 | 1.001 |
| 2 | 2.00 | 435.8 | 0.2054 | 0.9992 | 9.6 | 1.002 |
| 3 | 2.24 | 440.8 | 0.2048 | 0.9990 | 10.7 | 1.002 |
| 4 | 2.47 | 445.5 | 0.2042 | 0.9988 | 11.8 | 1.003 |
| 5 | 2.73 | 450.3 | 0.2035 | 0.9986 | 13.1 | 1.003 |
| 6 | 2.98 | 454.8 | 0.2029 | 0.9983 | 14.3 | 1.003 |
| 7 | 3.27 | 459.7 | 0.2022 | 0.9979 | 15.7 | 1.004 |
| 8 | 3.56 | 464.4 | 0.2015 | 0.9975 | 17.1 | 1.004 |
| 9 | 3.88 | 469.4 | 0.2008 | 0.9970 | 18.7 | 1.005 |
| 10 | 4.19 | 474.2 | 0.2001 | 0.9964 | 20.2 | 1.006 |
| 11 | 4.55 | 479.3 | 0.1993 | 0.9956 | 22.0 | 1.006 |
| 12 | 4.89 | 483.9 | 0.1986 | 0.9949 | 23.6 | 1.007 |
| 13 | 5.25 | 488.9 | 0.1978 | 0.9939 | 25.4 | 1.008 |
| 14 | 5.65 | 493.9 | 0.1970 | 0.9928 | 27.4 | 1.008 |
| 15 | 6.02 | 498.3 | 0.1963 | 0.9917 | 29.2 | 1.009 |
| 16 | 6.40 | 502.9 | 0.1956 | 0.9903 | 31.0 | 1.010 |
| 17 | 6.88 | 508.3 | 0.1947 | 0.9886 | 33.4 | 1.011 |
| 18 | 7.32 | 513.0 | 0.1939 | 0.9868 | 35.6 | 1.012 |
| 19 | 7.80 | 517.9 | 0.1931 | 0.9847 | 37.9 | 1.013 |
| 20 | 8.27 | 522.5 | 0.1923 | 0.9825 | 40.1 | 1.014 |
| 21 | 8.74 | 527.1 | 0.1916 | 0.9801 | 42.4 | 1.015 |
| 22 | 9.33 | 532.6 | 0.1907 | 0.9768 | 45.2 | 1.017 |
| 23 | 9.88 | 537.3 | 0.1899 | 0.9737 | 47.9 | 1.018 |
| 24 | 12.67 | 557.2 | 0.1861 | 0.9571 | 60.9 | 1.026 |

**Table A5.**

solute; $C_2H_5OH$: 0.646 (mol)

solvent; $C_8H_{18}O_5$: 2.579 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.35 | 425.0 | 0.1960 | 0.9994 | 6.8 | 1.001 |
| 2 | 1.50 | 429.7 | 0.1956 | 0.9993 | 7.5 | 1.001 |
| 3 | 1.71 | 435.2 | 0.1950 | 0.9991 | 8.6 | 1.001 |
| 4 | 1.88 | 439.3 | 0.1945 | 0.9989 | 9.4 | 1.002 |
| 5 | 2.09 | 444.5 | 0.1939 | 0.9987 | 10.5 | 1.002 |
| 6 | 2.32 | 449.4 | 0.1934 | 0.9984 | 11.7 | 1.003 |
| 7 | 2.55 | 454.3 | 0.1928 | 0.9980 | 12.8 | 1.003 |
| 8 | 2.83 | 459.4 | 0.1920 | 0.9976 | 14.3 | 1.004 |
| 9 | 3.07 | 463.9 | 0.1915 | 0.9971 | 15.5 | 1.004 |
| 10 | 3.37 | 469.1 | 0.1907 | 0.9965 | 17.0 | 1.005 |
| 11 | 3.65 | 473.7 | 0.1901 | 0.9959 | 18.5 | 1.006 |
| 12 | 3.97 | 479.0 | 0.1894 | 0.9950 | 20.1 | 1.006 |
| 13 | 4.27 | 483.5 | 0.1887 | 0.9942 | 21.6 | 1.007 |
| 14 | 4.63 | 488.8 | 0.1879 | 0.9931 | 23.5 | 1.008 |
| 15 | 4.95 | 493.4 | 0.1872 | 0.9919 | 25.1 | 1.008 |
| 16 | 5.32 | 498.3 | 0.1865 | 0.9905 | 27.0 | 1.009 |
| 17 | 5.71 | 503.4 | 0.1857 | 0.9888 | 29.0 | 1.010 |
| 18 | 6.05 | 507.8 | 0.1851 | 0.9871 | 30.7 | 1.011 |
| 19 | 6.42 | 512.5 | 0.1844 | 0.9851 | 32.6 | 1.012 |
| 20 | 6.87 | 517.8 | 0.1837 | 0.9826 | 34.8 | 1.013 |
| 21 | 7.26 | 522.4 | 0.1830 | 0.9801 | 36.8 | 1.014 |
| 22 | 7.69 | 527.2 | 0.1823 | 0.9772 | 38.9 | 1.015 |
| 23 | 8.11 | 532.0 | 0.1817 | 0.9739 | 41.0 | 1.016 |
| 24 | 8.58 | 536.9 | 0.1811 | 0.9702 | 43.2 | 1.018 |

**Table A6.**

solute; $C_3H_7OH$: 0.572 (mol)

solvent; $C_8H_{18}O_5$: 2.446 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.80 | 433.3 | 0.1866 | 0.9984 | 4.2 | 1.000 |
| 2 | 0.91 | 438.5 | 0.1863 | 0.9980 | 4.8 | 1.000 |
| 3 | 1.04 | 443.1 | 0.1859 | 0.9976 | 5.5 | 1.000 |
| 4 | 1.19 | 448.4 | 0.1854 | 0.9971 | 6.3 | 1.000 |
| 5 | 1.33 | 452.3 | 0.1850 | 0.9968 | 7.0 | 1.001 |
| 6 | 1.47 | 457.9 | 0.1846 | 0.9960 | 7.8 | 1.001 |
| 7 | 1.62 | 462.1 | 0.1841 | 0.9953 | 8.6 | 1.002 |
| 8 | 1.79 | 467.1 | 0.1837 | 0.9945 | 9.5 | 1.002 |
| 9 | 1.97 | 471.9 | 0.1832 | 0.9935 | 10.4 | 1.002 |
| 10 | 2.15 | 476.4 | 0.1827 | 0.9924 | 11.4 | 1.003 |
| 11 | 2.38 | 481.6 | 0.1821 | 0.9911 | 12.6 | 1.003 |
| 12 | 2.60 | 486.6 | 0.1815 | 0.9895 | 13.7 | 1.004 |
| 13 | 2.83 | 491.5 | 0.1810 | 0.9878 | 14.9 | 1.005 |
| 14 | 3.06 | 496.3 | 0.1804 | 0.9858 | 16.1 | 1.005 |
| 15 | 3.30 | 501.1 | 0.1799 | 0.9836 | 17.4 | 1.006 |
| 16 | 3.56 | 505.9 | 0.1793 | 0.9812 | 18.7 | 1.007 |
| 17 | 3.81 | 510.5 | 0.1787 | 0.9785 | 20.0 | 1.007 |
| 18 | 4.10 | 515.5 | 0.1781 | 0.9753 | 21.5 | 1.008 |
| 19 | 4.40 | 520.5 | 0.1775 | 0.9716 | 23.0 | 1.009 |
| 20 | 4.68 | 525.0 | 0.1770 | 0.9680 | 24.4 | 1.010 |
| 21 | 5.01 | 530.1 | 0.1764 | 0.9634 | 26.0 | 1.011 |
| 22 | 5.34 | 535.0 | 0.1758 | 0.9584 | 27.6 | 1.012 |
| 23 | 5.66 | 539.2 | 0.1753 | 0.9539 | 29.2 | 1.012 |
| 24 | 6.03 | 544.4 | 0.1747 | 0.9476 | 30.9 | 1.014 |

**Table A7.**

solute; $C_4H_9OH$: 0.585 (mol)

solvent; $C_8H_{18}O_5$: 2.425 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.15 | 453.8 | 0.1904 | 0.9960 | 5.9 | 1.000 |
| 2 | 1.32 | 458.3 | 0.1899 | 0.9954 | 6.8 | 1.001 |
| 3 | 1.46 | 463.2 | 0.1895 | 0.9945 | 7.4 | 1.001 |
| 4 | 1.63 | 468.4 | 0.1891 | 0.9935 | 8.3 | 1.002 |
| 5 | 1.79 | 472.8 | 0.1886 | 0.9925 | 9.1 | 1.002 |
| 6 | 1.95 | 477.2 | 0.1882 | 0.9913 | 9.9 | 1.003 |
| 7 | 2.16 | 482.6 | 0.1876 | 0.9897 | 11.0 | 1.003 |
| 8 | 2.37 | 487.5 | 0.1871 | 0.9881 | 12.0 | 1.004 |
| 9 | 2.56 | 491.8 | 0.1867 | 0.9864 | 13.0 | 1.005 |
| 10 | 2.83 | 497.3 | 0.1860 | 0.9840 | 14.3 | 1.005 |
| 11 | 3.08 | 502.3 | 0.1854 | 0.9816 | 15.6 | 1.006 |
| 12 | 3.34 | 506.9 | 0.1848 | 0.9791 | 16.8 | 1.007 |
| 13 | 3.58 | 511.0 | 0.1843 | 0.9766 | 18.0 | 1.008 |
| 14 | 3.88 | 516.0 | 0.1836 | 0.9733 | 19.5 | 1.008 |
| 15 | 4.18 | 520.6 | 0.1830 | 0.9699 | 20.9 | 1.009 |
| 16 | 4.55 | 525.8 | 0.1822 | 0.9657 | 22.7 | 1.011 |
| 17 | 4.98 | 531.1 | 0.1813 | 0.9612 | 24.7 | 1.012 |
| 18 | 5.38 | 535.9 | 0.1805 | 0.9566 | 26.6 | 1.013 |

**Table A8.**

solute; $C_5H_{11}OH$: 0.445 (mol)

solvent; $C_8H_{18}O_5$: 2.368 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.80 | 453.1 | 0.1550 | 0.9943 | 5.1 | 0.999 |
| 2 | 0.80 | 458.2 | 0.1550 | 0.9924 | 5.0 | 0.999 |
| 3 | 0.81 | 463.0 | 0.1550 | 0.9903 | 5.1 | 0.999 |
| 4 | 0.90 | 467.9 | 0.1547 | 0.9886 | 5.7 | 1.000 |
| 5 | 1.02 | 472.5 | 0.1544 | 0.9871 | 6.4 | 1.000 |
| 6 | 1.09 | 475.0 | 0.1542 | 0.9862 | 6.8 | 1.000 |
| 7 | 1.29 | 482.2 | 0.1535 | 0.9831 | 8.0 | 1.001 |
| 8 | 1.41 | 487.1 | 0.1532 | 0.9804 | 8.8 | 1.001 |
| 9 | 1.55 | 492.2 | 0.1528 | 0.9773 | 9.6 | 1.002 |
| 10 | 1.69 | 496.3 | 0.1524 | 0.9747 | 10.5 | 1.002 |
| 11 | 1.86 | 501.3 | 0.1520 | 0.9711 | 11.5 | 1.003 |
| 12 | 2.04 | 505.9 | 0.1515 | 0.9676 | 12.6 | 1.003 |
| 13 | 2.25 | 510.9 | 0.1509 | 0.9635 | 13.8 | 1.004 |
| 14 | 2.44 | 515.1 | 0.1504 | 0.9597 | 14.9 | 1.005 |
| 15 | 2.65 | 519.9 | 0.1499 | 0.9548 | 16.2 | 1.005 |
| 16 | 2.92 | 524.7 | 0.1492 | 0.9499 | 17.7 | 1.006 |
| 17 | 3.26 | 530.1 | 0.1484 | 0.9442 | 19.6 | 1.008 |
| 18 | 3.58 | 534.7 | 0.1476 | 0.9391 | 21.5 | 1.009 |

**Table A9.**

solute; $H_2O$: 0.615 (mol)

solvent; $C_8H_{18}O_5$: 2.291 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.41 | 449.9 | 0.2061 | 0.9975 | 6.8 | 1.000 |
| 2 | 1.54 | 453.7 | 0.2056 | 0.9971 | 7.4 | 1.001 |
| 3 | 1.73 | 458.3 | 0.2050 | 0.9966 | 8.3 | 1.001 |
| 4 | 1.92 | 463.4 | 0.2044 | 0.9960 | 9.2 | 1.001 |
| 5 | 2.12 | 468.4 | 0.2038 | 0.9952 | 10.3 | 1.001 |
| 6 | 2.37 | 473.5 | 0.2030 | 0.9943 | 11.4 | 1.001 |
| 7 | 2.58 | 478.3 | 0.2023 | 0.9934 | 12.5 | 1.002 |
| 8 | 2.85 | 483.4 | 0.2015 | 0.9922 | 13.9 | 1.002 |
| 9 | 3.13 | 488.2 | 0.2007 | 0.9911 | 15.2 | 1.002 |
| 10 | 3.43 | 493.3 | 0.1999 | 0.9895 | 16.7 | 1.003 |
| 11 | 3.76 | 498.4 | 0.1989 | 0.9879 | 18.4 | 1.003 |
| 12 | 4.08 | 503.0 | 0.1980 | 0.9862 | 19.9 | 1.004 |
| 13 | 4.46 | 508.1 | 0.1970 | 0.9842 | 21.8 | 1.004 |
| 14 | 4.86 | 513.0 | 0.1960 | 0.9820 | 23.8 | 1.005 |
| 15 | 5.28 | 517.9 | 0.1949 | 0.9797 | 25.9 | 1.005 |
| 16 | 5.76 | 523.0 | 0.1936 | 0.9770 | 28.4 | 1.006 |
| 17 | 6.28 | 528.1 | 0.1924 | 0.9740 | 30.9 | 1.007 |
| 18 | 6.80 | 532.9 | 0.1911 | 0.9709 | 33.5 | 1.007 |
| 19 | 7.36 | 537.8 | 0.1898 | 0.9674 | 36.4 | 1.008 |

**Table A10.**

solute; $CO_2$: 0.450 (mol)

solvent; $C_{10}H_{14}$: 3.922 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 24.38 | 399.9 | 0.0491 | 0.9999 | 455.4 | 1.036 |
| 2 | 25.22 | 407.4 | 0.0487 | 0.9998 | 475.8 | 1.038 |
| 3 | 25.77 | 412.6 | 0.0484 | 0.9998 | 488.8 | 1.038 |
| 4 | 26.31 | 417.6 | 0.0482 | 0.9997 | 501.4 | 1.039 |
| 5 | 26.76 | 422.1 | 0.0481 | 0.9997 | 511.1 | 1.040 |
| 6 | 27.32 | 427.3 | 0.0479 | 0.9996 | 523.9 | 1.041 |
| 7 | 27.82 | 432.1 | 0.0478 | 0.9995 | 534.9 | 1.042 |
| 8 | 28.33 | 437.2 | 0.0477 | 0.9994 | 545.9 | 1.043 |
| 9 | 28.78 | 441.9 | 0.0478 | 0.9993 | 554.1 | 1.044 |
| 10 | 29.28 | 446.8 | 0.0477 | 0.9992 | 564.8 | 1.045 |
| 11 | 29.75 | 451.6 | 0.0477 | 0.9990 | 573.7 | 1.046 |
| 12 | 30.23 | 456.5 | 0.0477 | 0.9988 | 582.8 | 1.047 |
| 13 | 30.72 | 461.5 | 0.0477 | 0.9986 | 592.0 | 1.048 |
| 14 | 31.22 | 466.6 | 0.0478 | 0.9984 | 600.7 | 1.049 |
| 15 | 31.64 | 470.8 | 0.0478 | 0.9982 | 608.4 | 1.050 |
| 16 | 32.14 | 475.9 | 0.0479 | 0.9979 | 616.7 | 1.051 |
| 17 | 32.65 | 481.1 | 0.0480 | 0.9976 | 625.0 | 1.052 |
| 18 | 33.13 | 486.2 | 0.0481 | 0.9972 | 632.5 | 1.053 |
| 19 | 33.59 | 490.9 | 0.0483 | 0.9968 | 639.2 | 1.054 |
| 20 | 34.02 | 495.4 | 0.0484 | 0.9964 | 645.3 | 1.055 |
| 21 | 34.51 | 500.5 | 0.0486 | 0.9959 | 651.9 | 1.056 |
| 22 | 34.95 | 505.4 | 0.0488 | 0.9954 | 656.7 | 1.058 |
| 23 | 35.47 | 510.5 | 0.0489 | 0.9948 | 664.2 | 1.059 |
| 24 | 35.91 | 515.4 | 0.0492 | 0.9942 | 668.3 | 1.060 |
| 25 | 36.33 | 520.0 | 0.0494 | 0.9935 | 672.6 | 1.062 |
| 26 | 36.83 | 525.0 | 0.0496 | 0.9927 | 678.1 | 1.063 |
| 27 | 37.31 | 530.2 | 0.0499 | 0.9918 | 682.4 | 1.064 |
| 28 | 37.76 | 534.8 | 0.0501 | 0.9909 | 686.1 | 1.066 |

**Table A11.**

solute; CO: 0.223 mol

solvent; $C_{10}H_{14}$: 3.899 mol

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 22.66 | 449.8 | 0.0075 | 0.9992 | 2931.4 | 1.035 |
| 2 | 23.10 | 460.0 | 0.0081 | 0.9989 | 2772.6 | 1.037 |
| 3 | 23.40 | 465.0 | 0.0082 | 0.9987 | 2761.1 | 1.037 |
| 4 | 23.63 | 469.7 | 0.0084 | 0.9985 | 2714.7 | 1.038 |
| 5 | 23.93 | 474.9 | 0.0086 | 0.9983 | 2693.9 | 1.039 |
| 6 | 24.18 | 479.7 | 0.0088 | 0.9980 | 2654.1 | 1.039 |
| 7 | 24.43 | 483.9 | 0.0089 | 0.9977 | 2642.9 | 1.040 |
| 8 | 24.73 | 489.3 | 0.0092 | 0.9973 | 2607.1 | 1.041 |
| 9 | 24.97 | 494.0 | 0.0094 | 0.9969 | 2569.4 | 1.042 |
| 10 | 25.26 | 498.9 | 0.0096 | 0.9965 | 2547.9 | 1.043 |
| 11 | 25.53 | 503.8 | 0.0098 | 0.9960 | 2511.1 | 1.043 |
| 12 | 25.78 | 508.5 | 0.0100 | 0.9955 | 2475.1 | 1.044 |
| 13 | 26.05 | 513.6 | 0.0103 | 0.9948 | 2431.2 | 1.045 |
| 14 | 26.31 | 518.0 | 0.0105 | 0.9942 | 2410.2 | 1.046 |
| 15 | 26.58 | 523.1 | 0.0107 | 0.9935 | 2370.0 | 1.047 |
| 16 | 26.87 | 528.0 | 0.0110 | 0.9927 | 2342.1 | 1.048 |
| 17 | 27.16 | 533.0 | 0.0112 | 0.9918 | 2310.8 | 1.049 |
| 18 | 27.43 | 537.8 | 0.0115 | 0.9908 | 2276.5 | 1.050 |

**Table A12.**

solute; $H_2$: 0.397 (mol)

solvent; $C_{10}H_{14}$: 3.860 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 33.39 | 405.6 | 0.0166 | 0.9999 | 1943.2 | 1.043 |
| 2 | 33.88 | 410.7 | 0.0167 | 0.9999 | 1956.6 | 1.044 |
| 3 | 34.34 | 415.8 | 0.0169 | 0.9999 | 1961.5 | 1.045 |
| 4 | 34.82 | 421.0 | 0.0171 | 0.9998 | 1970.9 | 1.045 |
| 5 | 35.27 | 426.0 | 0.0173 | 0.9998 | 1970.3 | 1.046 |
| 6 | 35.51 | 428.7 | 0.0174 | 0.9998 | 1970.8 | 1.047 |
| 7 | 36.14 | 436.4 | 0.0179 | 0.9997 | 1947.4 | 1.048 |
| 8 | 36.61 | 441.4 | 0.0181 | 0.9997 | 1952.0 | 1.049 |
| 9 | 37.06 | 446.4 | 0.0183 | 0.9996 | 1950.3 | 1.050 |
| 10 | 37.48 | 451.2 | 0.0185 | 0.9995 | 1947.0 | 1.051 |
| 11 | 37.94 | 456.3 | 0.0188 | 0.9994 | 1940.7 | 1.052 |
| 12 | 38.37 | 461.1 | 0.0190 | 0.9993 | 1938.4 | 1.053 |
| 13 | 38.81 | 466.1 | 0.0193 | 0.9992 | 1928.7 | 1.054 |
| 14 | 39.25 | 471.0 | 0.0195 | 0.9990 | 1922.9 | 1.055 |
| 15 | 39.67 | 475.9 | 0.0199 | 0.9989 | 1909.6 | 1.056 |
| 16 | 40.09 | 480.7 | 0.0201 | 0.9987 | 1902.1 | 1.057 |
| 17 | 40.51 | 485.5 | 0.0205 | 0.9985 | 1888.9 | 1.058 |
| 18 | 40.95 | 490.3 | 0.0207 | 0.9983 | 1882.8 | 1.060 |
| 19 | 41.39 | 495.4 | 0.0211 | 0.9980 | 1868.5 | 1.061 |
| 20 | 41.80 | 500.0 | 0.0214 | 0.9977 | 1857.4 | 1.062 |
| 21 | 42.23 | 505.0 | 0.0218 | 0.9974 | 1841.1 | 1.063 |
| 22 | 42.65 | 510.0 | 0.0221 | 0.9970 | 1824.6 | 1.065 |
| 23 | 43.07 | 514.7 | 0.0225 | 0.9967 | 1813.0 | 1.066 |
| 24 | 43.49 | 519.5 | 0.0228 | 0.9962 | 1798.3 | 1.067 |
| 25 | 43.89 | 524.2 | 0.0232 | 0.9958 | 1781.6 | 1.069 |
| 26 | 44.32 | 529.2 | 0.0236 | 0.9952 | 1765.0 | 1.070 |
| 27 | 44.75 | 534.3 | 0.0241 | 0.9946 | 1745.3 | 1.072 |
| 28 | 45.15 | 539.1 | 0.0245 | 0.9940 | 1725.1 | 1.073 |

**Table A13.**

solute; $CH_3OH$: 0.289 (mol)

solvent; $C_{10}H_{14}$: 3.843 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 2.80 | 425.9 | 0.0641 | 0.9981 | 42.3 | 1.003 |
| 2 | 2.98 | 430.6 | 0.0638 | 0.9978 | 45.2 | 1.004 |
| 3 | 3.18 | 435.7 | 0.0635 | 0.9974 | 48.4 | 1.004 |
| 4 | 3.38 | 440.4 | 0.0632 | 0.9970 | 51.7 | 1.004 |
| 5 | 3.60 | 445.4 | 0.0629 | 0.9966 | 55.3 | 1.005 |
| 6 | 3.81 | 450.2 | 0.0626 | 0.9961 | 58.6 | 1.005 |
| 7 | 4.01 | 455.1 | 0.0623 | 0.9955 | 61.9 | 1.005 |
| 8 | 4.24 | 460.1 | 0.0620 | 0.9948 | 65.8 | 1.006 |
| 9 | 4.45 | 464.6 | 0.0617 | 0.9941 | 69.1 | 1.006 |
| 10 | 4.68 | 469.6 | 0.0614 | 0.9933 | 73.1 | 1.007 |
| 11 | 4.91 | 474.4 | 0.0611 | 0.9924 | 76.7 | 1.007 |
| 12 | 5.14 | 479.3 | 0.0608 | 0.9914 | 80.6 | 1.008 |
| 13 | 5.37 | 484.2 | 0.0606 | 0.9904 | 84.5 | 1.008 |
| 14 | 5.61 | 489.2 | 0.0603 | 0.9891 | 88.5 | 1.008 |
| 15 | 5.83 | 493.7 | 0.0601 | 0.9879 | 92.0 | 1.009 |
| 16 | 6.09 | 498.8 | 0.0598 | 0.9864 | 96.4 | 1.009 |
| 17 | 6.34 | 503.7 | 0.0596 | 0.9848 | 100.5 | 1.010 |
| 18 | 6.57 | 508.4 | 0.0594 | 0.9832 | 104.3 | 1.010 |
| 19 | 6.83 | 513.4 | 0.0591 | 0.9813 | 108.5 | 1.011 |
| 20 | 7.09 | 518.5 | 0.0589 | 0.9792 | 112.8 | 1.011 |
| 21 | 7.34 | 523.2 | 0.0587 | 0.9771 | 116.8 | 1.012 |
| 22 | 7.63 | 528.3 | 0.0585 | 0.9746 | 121.6 | 1.013 |
| 23 | 7.87 | 533.2 | 0.0583 | 0.9720 | 125.4 | 1.013 |
| 24 | 8.16 | 538.3 | 0.0581 | 0.9692 | 129.9 | 1.014 |

**Table A14.**

solute; $C_2H_5OH$: 0.337 (mol)

solvent; $C_{10}H_{14}$: 3.843 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 2.31 | 427.1 | 0.0761 | 0.9976 | 29.4 | 1.003 |
| 2 | 2.47 | 429.7 | 0.0758 | 0.9975 | 31.5 | 1.003 |
| 3 | 2.63 | 435.9 | 0.0756 | 0.9969 | 33.6 | 1.003 |
| 4 | 2.82 | 440.9 | 0.0753 | 0.9965 | 36.2 | 1.004 |
| 5 | 2.99 | 445.7 | 0.0751 | 0.9959 | 38.3 | 1.004 |
| 6 | 3.17 | 450.7 | 0.0748 | 0.9953 | 40.8 | 1.005 |
| 7 | 3.38 | 455.6 | 0.0745 | 0.9947 | 43.5 | 1.005 |
| 8 | 3.58 | 460.4 | 0.0742 | 0.9939 | 46.2 | 1.005 |
| 9 | 3.77 | 464.7 | 0.0740 | 0.9932 | 48.7 | 1.006 |
| 10 | 4.01 | 469.9 | 0.0737 | 0.9923 | 51.9 | 1.006 |
| 11 | 4.22 | 474.7 | 0.0734 | 0.9913 | 54.7 | 1.007 |
| 12 | 4.44 | 479.0 | 0.0731 | 0.9904 | 57.7 | 1.007 |
| 13 | 4.68 | 484.0 | 0.0728 | 0.9892 | 60.9 | 1.008 |
| 14 | 4.89 | 488.7 | 0.0726 | 0.9879 | 63.7 | 1.008 |
| 15 | 5.18 | 494.3 | 0.0723 | 0.9864 | 67.6 | 1.009 |
| 16 | 5.41 | 499.1 | 0.0721 | 0.9848 | 70.6 | 1.009 |
| 17 | 5.67 | 504.1 | 0.0718 | 0.9831 | 74.1 | 1.010 |
| 18 | 5.93 | 509.0 | 0.0716 | 0.9813 | 77.5 | 1.011 |
| 19 | 6.18 | 513.8 | 0.0713 | 0.9794 | 80.8 | 1.011 |
| 20 | 6.44 | 518.6 | 0.0711 | 0.9772 | 84.2 | 1.012 |
| 21 | 6.69 | 523.3 | 0.0709 | 0.9750 | 87.4 | 1.012 |
| 22 | 6.96 | 528.0 | 0.0707 | 0.9726 | 90.9 | 1.013 |
| 23 | 7.22 | 532.9 | 0.0705 | 0.9700 | 94.3 | 1.014 |
| 24 | 7.49 | 537.9 | 0.0703 | 0.9670 | 97.8 | 1.014 |

**Table A15.**

solute; $C_3H_7OH$: 0.389 (mol)

solvent; $C_{10}H_{14}$: 3.832 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.23 | 426.6 | 0.0900 | 0.9960 | 13.4 | 1.001 |
| 2 | 1.36 | 431.4 | 0.0897 | 0.9955 | 14.8 | 1.001 |
| 3 | 1.48 | 436.7 | 0.0896 | 0.9948 | 16.0 | 1.001 |
| 4 | 1.60 | 441.4 | 0.0894 | 0.9941 | 17.3 | 1.002 |
| 5 | 1.73 | 446.2 | 0.0892 | 0.9933 | 18.8 | 1.002 |
| 6 | 1.89 | 451.4 | 0.0890 | 0.9925 | 20.4 | 1.002 |
| 7 | 2.02 | 456.1 | 0.0888 | 0.9916 | 22.0 | 1.003 |
| 8 | 2.17 | 460.5 | 0.0886 | 0.9907 | 23.5 | 1.003 |
| 9 | 2.33 | 465.5 | 0.0884 | 0.9895 | 25.3 | 1.003 |
| 10 | 2.50 | 470.5 | 0.0882 | 0.9883 | 27.1 | 1.004 |
| 11 | 2.67 | 475.3 | 0.0880 | 0.9870 | 29.0 | 1.004 |
| 12 | 2.86 | 480.3 | 0.0877 | 0.9856 | 31.0 | 1.005 |
| 13 | 3.02 | 484.7 | 0.0876 | 0.9841 | 32.7 | 1.005 |
| 14 | 3.23 | 490.0 | 0.0873 | 0.9823 | 35.0 | 1.006 |
| 15 | 3.42 | 494.7 | 0.0871 | 0.9805 | 37.0 | 1.006 |
| 16 | 3.64 | 500.2 | 0.0869 | 0.9783 | 39.3 | 1.007 |
| 17 | 3.86 | 505.0 | 0.0867 | 0.9763 | 41.6 | 1.007 |
| 18 | 4.06 | 509.9 | 0.0865 | 0.9739 | 43.8 | 1.008 |
| 19 | 4.28 | 514.4 | 0.0863 | 0.9716 | 46.0 | 1.008 |
| 20 | 4.51 | 519.7 | 0.0861 | 0.9687 | 48.4 | 1.009 |
| 21 | 4.72 | 524.4 | 0.0859 | 0.9659 | 50.6 | 1.009 |
| 22 | 4.96 | 529.2 | 0.0857 | 0.9630 | 53.1 | 1.010 |
| 23 | 5.19 | 533.9 | 0.0855 | 0.9599 | 55.4 | 1.011 |
| 24 | 5.44 | 539.0 | 0.0853 | 0.9563 | 58.0 | 1.011 |

**Table A16.**

solute; $C_4H_9OH$: 0.465 (mol)

solvent; $C_{10}H_{14}$: 3.389 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.10 | 446.3 | 0.1182 | 0.9902 | 9.0 | 1.000 |
| 2 | 1.23 | 451.5 | 0.1179 | 0.9892 | 10.1 | 1.001 |
| 3 | 1.36 | 456.2 | 0.1177 | 0.9882 | 11.2 | 1.001 |
| 4 | 1.46 | 460.7 | 0.1175 | 0.9869 | 11.9 | 1.001 |
| 5 | 1.60 | 465.7 | 0.1173 | 0.9856 | 13.0 | 1.002 |
| 6 | 1.74 | 470.5 | 0.1170 | 0.9842 | 14.2 | 1.002 |
| 7 | 1.88 | 475.1 | 0.1168 | 0.9828 | 15.3 | 1.003 |
| 8 | 2.02 | 479.9 | 0.1165 | 0.9811 | 16.4 | 1.003 |
| 9 | 2.17 | 484.7 | 0.1163 | 0.9793 | 17.7 | 1.003 |
| 10 | 2.35 | 490.0 | 0.1160 | 0.9772 | 19.1 | 1.004 |
| 11 | 2.52 | 494.5 | 0.1157 | 0.9754 | 20.5 | 1.004 |
| 12 | 2.69 | 499.1 | 0.1155 | 0.9733 | 21.8 | 1.005 |
| 13 | 2.85 | 503.7 | 0.1152 | 0.9710 | 23.0 | 1.005 |
| 14 | 3.06 | 508.8 | 0.1149 | 0.9684 | 24.7 | 1.006 |
| 15 | 3.24 | 513.5 | 0.1147 | 0.9657 | 26.1 | 1.007 |
| 16 | 3.48 | 518.6 | 0.1144 | 0.9629 | 27.9 | 1.007 |
| 17 | 3.67 | 523.4 | 0.1141 | 0.9597 | 29.4 | 1.008 |
| 18 | 3.91 | 528.3 | 0.1138 | 0.9566 | 31.2 | 1.009 |
| 19 | 4.13 | 533.2 | 0.1135 | 0.9532 | 32.9 | 1.009 |
| 20 | 4.35 | 537.9 | 0.1133 | 0.9496 | 34.6 | 1.010 |

**Table A17.**

solute; $C_5H_{11}OH$: 0.382 (mol)

solvent; $C_{10}H_{14}$: 3.389 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.03 | 463.9 | 0.0990 | 0.9793 | 10.0 | 1.000 |
| 2 | 1.12 | 468.9 | 0.0988 | 0.9771 | 10.8 | 1.000 |
| 3 | 1.24 | 473.8 | 0.0986 | 0.9753 | 11.9 | 1.001 |
| 4 | 1.35 | 478.3 | 0.0984 | 0.9735 | 13.0 | 1.001 |
| 5 | 1.44 | 483.3 | 0.0983 | 0.9706 | 13.8 | 1.001 |
| 6 | 1.56 | 488.3 | 0.0981 | 0.9679 | 14.9 | 1.002 |
| 7 | 1.68 | 493.1 | 0.0979 | 0.9653 | 16.0 | 1.002 |
| 8 | 1.81 | 497.9 | 0.0976 | 0.9624 | 17.2 | 1.003 |
| 9 | 1.94 | 502.9 | 0.0974 | 0.9591 | 18.4 | 1.003 |
| 10 | 2.08 | 507.7 | 0.0972 | 0.9559 | 19.7 | 1.004 |
| 11 | 2.24 | 512.7 | 0.0970 | 0.9524 | 21.1 | 1.004 |
| 12 | 2.38 | 517.5 | 0.0968 | 0.9487 | 22.4 | 1.005 |
| 13 | 2.54 | 522.4 | 0.0966 | 0.9448 | 23.8 | 1.005 |
| 14 | 2.72 | 527.3 | 0.0963 | 0.9408 | 25.4 | 1.006 |
| 15 | 2.88 | 532.1 | 0.0961 | 0.9364 | 26.8 | 1.006 |
| 16 | 3.09 | 537.1 | 0.0959 | 0.9322 | 28.6 | 1.007 |
| 17 | 3.28 | 542.0 | 0.0956 | 0.9275 | 30.2 | 1.007 |

**Table A18.**

solute; $H_2O$: 0.309 (mol)

solvent; $C_{10}H_{14}$: 3.394 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 3.61 | 419.8 | 0.0727 | 0.9989 | 48.4 | 1.003 |
| 2 | 4.00 | 424.8 | 0.0717 | 0.9987 | 54.3 | 1.003 |
| 3 | 4.32 | 430.0 | 0.0709 | 0.9985 | 59.1 | 1.004 |
| 4 | 4.61 | 435.0 | 0.0702 | 0.9982 | 63.5 | 1.004 |
| 5 | 4.87 | 439.6 | 0.0697 | 0.9979 | 67.6 | 1.004 |
| 6 | 5.16 | 444.7 | 0.0690 | 0.9976 | 72.1 | 1.005 |
| 7 | 5.42 | 449.5 | 0.0685 | 0.9972 | 76.3 | 1.005 |
| 8 | 5.71 | 454.2 | 0.0679 | 0.9968 | 81.1 | 1.005 |
| 9 | 5.99 | 459.2 | 0.0673 | 0.9963 | 85.6 | 1.006 |
| 10 | 6.29 | 464.3 | 0.0667 | 0.9957 | 90.6 | 1.006 |
| 11 | 6.56 | 469.1 | 0.0662 | 0.9951 | 95.0 | 1.006 |
| 12 | 6.83 | 473.7 | 0.0658 | 0.9945 | 99.5 | 1.007 |
| 13 | 7.08 | 478.4 | 0.0653 | 0.9938 | 103.7 | 1.007 |
| 14 | 7.38 | 483.7 | 0.0648 | 0.9928 | 108.7 | 1.007 |
| 15 | 7.64 | 488.3 | 0.0644 | 0.9920 | 113.2 | 1.008 |
| 16 | 7.92 | 493.3 | 0.0640 | 0.9909 | 117.8 | 1.008 |
| 17 | 8.16 | 497.8 | 0.0636 | 0.9898 | 121.9 | 1.008 |
| 18 | 8.44 | 503.0 | 0.0633 | 0.9885 | 126.6 | 1.009 |
| 19 | 8.72 | 508.0 | 0.0629 | 0.9870 | 131.3 | 1.009 |
| 20 | 8.97 | 512.8 | 0.0626 | 0.9855 | 135.5 | 1.010 |
| 21 | 9.22 | 517.5 | 0.0623 | 0.9839 | 139.6 | 1.010 |
| 22 | 9.46 | 522.4 | 0.0621 | 0.9820 | 143.5 | 1.010 |
| 23 | 9.72 | 527.1 | 0.0618 | 0.9802 | 147.7 | 1.011 |
| 24 | 9.98 | 532.0 | 0.0615 | 0.9780 | 151.9 | 1.011 |
| 25 | 10.27 | 537.0 | 0.0612 | 0.9757 | 156.6 | 1.012 |
| 26 | 10.55 | 542.0 | 0.0610 | 0.9732 | 161.2 | 1.012 |

**Table A19.**

solute; CO: 0.554 (mol)

solvent; $C_{16}H_{34}$: 2.093 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 31.37 | 301.0 | 0.0466 | 1.0000 | 623.0 | 1.066 |
| 2 | 31.76 | 305.0 | 0.0478 | 1.0000 | 615.1 | 1.067 |
| 3 | 32.38 | 310.6 | 0.0490 | 1.0000 | 611.7 | 1.068 |
| 4 | 32.91 | 315.4 | 0.0501 | 1.0000 | 608.8 | 1.069 |
| 5 | 33.41 | 319.7 | 0.0509 | 1.0000 | 607.9 | 1.071 |
| 6 | 33.97 | 324.5 | 0.0519 | 1.0000 | 606.2 | 1.072 |
| 7 | 34.68 | 330.7 | 0.0532 | 1.0000 | 603.6 | 1.074 |
| 8 | 35.23 | 335.5 | 0.0542 | 1.0000 | 601.5 | 1.076 |
| 9 | 35.76 | 340.2 | 0.0552 | 1.0000 | 599.0 | 1.077 |
| 10 | 36.38 | 345.6 | 0.0564 | 1.0000 | 596.3 | 1.079 |
| 11 | 36.88 | 350.0 | 0.0574 | 1.0000 | 593.9 | 1.081 |
| 12 | 37.48 | 355.2 | 0.0586 | 1.0000 | 590.7 | 1.083 |
| 13 | 38.07 | 360.4 | 0.0597 | 1.0000 | 587.7 | 1.085 |
| 14 | 38.64 | 365.4 | 0.0609 | 1.0000 | 584.2 | 1.087 |
| 15 | 39.20 | 370.4 | 0.0621 | 1.0000 | 580.5 | 1.089 |
| 16 | 39.72 | 375.0 | 0.0633 | 1.0000 | 576.8 | 1.091 |
| 17 | 40.30 | 380.1 | 0.0646 | 1.0000 | 572.4 | 1.093 |
| 18 | 40.88 | 385.3 | 0.0660 | 1.0000 | 568.1 | 1.095 |
| 19 | 41.32 | 389.3 | 0.0671 | 1.0000 | 564.6 | 1.097 |
| 20 | 41.94 | 394.8 | 0.0685 | 1.0000 | 559.7 | 1.100 |
| 21 | 42.53 | 400.2 | 0.0701 | 0.9999 | 554.1 | 1.102 |
| 22 | 43.10 | 405.4 | 0.0716 | 0.9999 | 549.0 | 1.105 |
| 23 | 43.54 | 409.4 | 0.0728 | 0.9999 | 544.9 | 1.107 |
| 24 | 44.15 | 415.0 | 0.0744 | 0.9999 | 539.0 | 1.110 |
| 25 | 44.74 | 420.3 | 0.0760 | 0.9999 | 533.7 | 1.113 |
| 26 | 45.08 | 424.8 | 0.0780 | 0.9999 | 523.4 | 1.116 |
| 27 | 45.61 | 429.7 | 0.0795 | 0.9998 | 518.2 | 1.119 |
| 28 | 46.20 | 435.2 | 0.0812 | 0.9998 | 512.5 | 1.122 |
| 29 | 46.72 | 440.0 | 0.0828 | 0.9998 | 507.2 | 1.125 |
| 30 | 47.28 | 445.2 | 0.0845 | 0.9997 | 501.5 | 1.129 |
| 31 | 47.80 | 450.2 | 0.0862 | 0.9997 | 495.9 | 1.132 |
| 32 | 48.33 | 455.0 | 0.0878 | 0.9996 | 490.7 | 1.136 |
| 33 | 48.78 | 459.2 | 0.0893 | 0.9996 | 486.0 | 1.139 |
| 34 | 49.37 | 464.8 | 0.0913 | 0.9995 | 479.5 | 1.144 |
| 35 | 49.90 | 469.9 | 0.0931 | 0.9994 | 473.5 | 1.148 |
| 36 | 50.42 | 474.8 | 0.0949 | 0.9994 | 467.9 | 1.152 |
| 37 | 50.85 | 478.8 | 0.0964 | 0.9993 | 463.2 | 1.156 |
| 38 | 51.48 | 484.8 | 0.0986 | 0.9992 | 456.3 | 1.162 |
| 39 | 52.00 | 489.7 | 0.1004 | 0.9991 | 450.9 | 1.166 |
| 40 | 52.52 | 494.3 | 0.1021 | 0.9990 | 446.0 | 1.171 |
| 41 | 52.95 | 498.4 | 0.1037 | 0.9989 | 441.2 | 1.176 |
| 42 | 53.49 | 503.6 | 0.1058 | 0.9988 | 434.9 | 1.182 |
| 43 | 53.92 | 507.7 | 0.1074 | 0.9987 | 430.0 | 1.187 |
| 44 | 54.34 | 511.7 | 0.1090 | 0.9986 | 425.3 | 1.192 |

**Table A20.**

solute; $H_2$: 0.606 (mol)

solvent; $C_{16}H_{34}$: 2.106 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 37.99 | 301.0 | 0.0337 | 1.0000 | 1068.4 | 1.068 |
| 2 | 38.42 | 305.2 | 0.0353 | 1.0000 | 1028.5 | 1.069 |
| 3 | 38.90 | 309.2 | 0.0364 | 1.0000 | 1009.4 | 1.070 |
| 4 | 39.42 | 313.1 | 0.0373 | 1.0000 | 997.9 | 1.071 |
| 5 | 39.96 | 317.3 | 0.0383 | 1.0000 | 983.8 | 1.073 |
| 6 | 40.55 | 321.7 | 0.0392 | 1.0000 | 973.8 | 1.074 |
| 7 | 41.18 | 326.4 | 0.0402 | 1.0000 | 963.8 | 1.076 |
| 8 | 41.77 | 330.7 | 0.0411 | 1.0000 | 954.6 | 1.077 |
| 9 | 42.37 | 335.2 | 0.0422 | 1.0000 | 942.4 | 1.079 |
| 10 | 43.12 | 340.7 | 0.0433 | 1.0000 | 932.1 | 1.081 |
| 11 | 43.82 | 345.9 | 0.0446 | 1.0000 | 919.5 | 1.083 |
| 12 | 44.56 | 351.4 | 0.0459 | 1.0000 | 906.8 | 1.085 |
| 13 | 45.09 | 355.3 | 0.0468 | 1.0000 | 898.0 | 1.087 |
| 14 | 45.83 | 360.8 | 0.0482 | 1.0000 | 884.9 | 1.089 |
| 15 | 46.43 | 365.3 | 0.0493 | 1.0000 | 874.5 | 1.091 |
| 16 | 47.08 | 370.2 | 0.0507 | 1.0000 | 861.3 | 1.094 |
| 17 | 47.74 | 375.2 | 0.0520 | 1.0000 | 849.5 | 1.096 |
| 18 | 48.55 | 381.2 | 0.0537 | 1.0000 | 834.9 | 1.099 |
| 19 | 49.14 | 385.6 | 0.0549 | 1.0000 | 824.9 | 1.101 |
| 20 | 49.95 | 391.6 | 0.0566 | 1.0000 | 811.0 | 1.104 |
| 21 | 50.54 | 396.0 | 0.0579 | 1.0000 | 800.7 | 1.107 |
| 22 | 51.32 | 401.9 | 0.0597 | 1.0000 | 786.3 | 1.110 |
| 23 | 52.02 | 407.3 | 0.0613 | 0.9999 | 773.6 | 1.113 |
| 24 | 52.55 | 411.2 | 0.0625 | 0.9999 | 765.1 | 1.116 |
| 25 | 53.11 | 415.7 | 0.0641 | 0.9999 | 752.3 | 1.118 |
| 26 | 53.77 | 420.6 | 0.0656 | 0.9999 | 741.7 | 1.122 |
| 27 | 54.52 | 426.3 | 0.0675 | 0.9999 | 728.5 | 1.125 |
| 28 | 55.14 | 431.0 | 0.0691 | 0.9999 | 717.9 | 1.129 |
| 29 | 55.86 | 436.5 | 0.0710 | 0.9998 | 705.4 | 1.133 |
| 30 | 56.51 | 441.4 | 0.0727 | 0.9998 | 694.8 | 1.136 |
| 31 | 57.10 | 445.9 | 0.0743 | 0.9998 | 685.0 | 1.140 |
| 32 | 57.80 | 451.2 | 0.0762 | 0.9998 | 673.7 | 1.144 |
| 33 | 58.47 | 456.3 | 0.0780 | 0.9997 | 663.2 | 1.148 |
| 34 | 59.10 | 461.0 | 0.0798 | 0.9997 | 653.4 | 1.152 |
| 35 | 59.78 | 466.3 | 0.0818 | 0.9996 | 641.8 | 1.157 |
| 36 | 60.31 | 470.6 | 0.0835 | 0.9996 | 632.1 | 1.161 |
| 37 | 61.03 | 476.2 | 0.0858 | 0.9995 | 620.1 | 1.166 |
| 38 | 61.70 | 481.3 | 0.0878 | 0.9994 | 609.8 | 1.172 |
| 39 | 62.20 | 485.3 | 0.0893 | 0.9994 | 601.8 | 1.176 |
| 40 | 62.92 | 491.0 | 0.0917 | 0.9993 | 590.2 | 1.182 |
| 41 | 63.52 | 495.6 | 0.0936 | 0.9992 | 581.2 | 1.187 |
| 42 | 64.06 | 499.8 | 0.0953 | 0.9991 | 573.1 | 1.192 |
| 43 | 64.68 | 504.5 | 0.0972 | 0.9990 | 564.5 | 1.198 |
| 44 | 65.19 | 508.4 | 0.0988 | 0.9989 | 557.2 | 1.203 |

**Table A21.**

solute; $CO_2$: 0.533 (mol)

solvent; $C_{16}H_{34}$: 2.102 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 12.42 | 305.7 | 0.1453 | 1.0000 | 78.3 | 1.024 |
| 2 | 12.85 | 309.8 | 0.1443 | 1.0000 | 81.6 | 1.025 |
| 3 | 13.36 | 314.6 | 0.1432 | 1.0000 | 85.4 | 1.026 |
| 4 | 13.85 | 319.0 | 0.1422 | 1.0000 | 89.1 | 1.027 |
| 5 | 14.31 | 323.3 | 0.1413 | 1.0000 | 92.6 | 1.028 |
| 6 | 14.89 | 328.7 | 0.1402 | 1.0000 | 97.1 | 1.029 |
| 7 | 15.40 | 333.4 | 0.1394 | 1.0000 | 101.0 | 1.031 |
| 8 | 16.11 | 340.1 | 0.1383 | 1.0000 | 106.3 | 1.032 |
| 9 | 16.80 | 346.6 | 0.1375 | 1.0000 | 111.6 | 1.034 |
| 10 | 17.22 | 350.6 | 0.1370 | 1.0000 | 114.7 | 1.035 |
| 11 | 17.66 | 354.7 | 0.1365 | 1.0000 | 118.0 | 1.036 |
| 12 | 18.23 | 360.1 | 0.1360 | 1.0000 | 122.2 | 1.038 |
| 13 | 18.72 | 364.9 | 0.1357 | 1.0000 | 125.8 | 1.039 |
| 14 | 19.20 | 369.5 | 0.1353 | 1.0000 | 129.3 | 1.040 |
| 15 | 19.72 | 374.7 | 0.1351 | 1.0000 | 133.0 | 1.042 |
| 16 | 20.20 | 379.3 | 0.1349 | 1.0000 | 136.4 | 1.043 |
| 17 | 20.73 | 384.4 | 0.1347 | 0.9999 | 140.1 | 1.045 |
| 18 | 21.26 | 389.7 | 0.1346 | 0.9999 | 143.8 | 1.047 |
| 19 | 21.80 | 394.9 | 0.1346 | 0.9999 | 147.4 | 1.048 |
| 20 | 22.27 | 399.6 | 0.1346 | 0.9999 | 150.5 | 1.050 |
| 21 | 22.76 | 404.5 | 0.1347 | 0.9999 | 153.5 | 1.052 |
| 22 | 23.28 | 409.9 | 0.1349 | 0.9998 | 156.8 | 1.054 |
| 23 | 23.75 | 414.6 | 0.1352 | 0.9998 | 159.5 | 1.055 |
| 24 | 24.22 | 419.5 | 0.1354 | 0.9998 | 162.2 | 1.057 |
| 25 | 24.72 | 424.6 | 0.1358 | 0.9997 | 165.1 | 1.059 |
| 26 | 25.20 | 429.5 | 0.1361 | 0.9997 | 167.7 | 1.061 |
| 27 | 25.67 | 434.3 | 0.1365 | 0.9996 | 170.1 | 1.063 |
| 28 | 26.14 | 439.2 | 0.1370 | 0.9995 | 172.5 | 1.065 |
| 29 | 26.63 | 444.3 | 0.1375 | 0.9995 | 174.8 | 1.068 |
| 30 | 27.10 | 449.2 | 0.1381 | 0.9994 | 177.0 | 1.070 |
| 31 | 27.59 | 454.3 | 0.1387 | 0.9993 | 179.1 | 1.072 |
| 32 | 28.05 | 459.3 | 0.1394 | 0.9992 | 180.9 | 1.075 |
| 33 | 28.50 | 464.1 | 0.1401 | 0.9991 | 182.7 | 1.077 |
| 34 | 28.99 | 469.3 | 0.1409 | 0.9990 | 184.5 | 1.080 |
| 35 | 29.45 | 474.3 | 0.1417 | 0.9988 | 185.9 | 1.083 |
| 36 | 29.92 | 479.5 | 0.1427 | 0.9987 | 187.3 | 1.086 |
| *37* | *30.34* | *484.0* | *0.1435* | *0.9985* | *188.4* | *1.089* |
| 38 | 30.81 | 489.0 | 0.1444 | 0.9983 | 189.7 | 1.092 |
| 39 | 31.29 | 494.3 | 0.1455 | 0.9981 | 190.8 | 1.096 |
| 40 | 31.76 | 499.5 | 0.1466 | 0.9979 | 191.6 | 1.100 |
| 41 | 32.15 | 503.7 | 0.1475 | 0.9978 | 192.3 | 1.103 |
| 42 | 32.54 | 508.0 | 0.1485 | 0.9976 | 192.8 | 1.107 |
| 43 | 32.92 | 512.3 | 0.1495 | 0.9974 | 193.3 | 1.110 |

**Table A22.**

solute; $C_2H_6$ 0.614 (mol)

solvent; $C_{16}H_{34}$: 1.890 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 7.02 | 307.6 | 0.2101 | 1.0000 | 31.1 | 1.016 |
| 2 | 7.41 | 311.7 | 0.2087 | 1.0000 | 33.0 | 1.017 |
| 3 | 7.85 | 316.2 | 0.2071 | 1.0000 | 35.2 | 1.018 |
| 4 | 8.33 | 321.2 | 0.2055 | 1.0000 | 37.6 | 1.020 |
| 5 | 8.88 | 326.9 | 0.2037 | 1.0000 | 40.3 | 1.021 |
| 6 | 9.39 | 332.0 | 0.2021 | 1.0000 | 42.9 | 1.022 |
| 7 | 9.89 | 336.9 | 0.2005 | 1.0000 | 45.4 | 1.024 |
| 8 | 10.36 | 341.6 | 0.1992 | 1.0000 | 47.9 | 1.025 |
| 9 | 10.84 | 346.4 | 0.1979 | 1.0000 | 50.3 | 1.026 |
| 10 | 11.32 | 351.1 | 0.1966 | 1.0000 | 52.8 | 1.028 |
| 11 | 11.73 | 355.2 | 0.1956 | 1.0000 | 55.0 | 1.029 |
| 12 | 12.29 | 360.6 | 0.1942 | 1.0000 | 57.9 | 1.031 |
| 13 | 12.84 | 366.1 | 0.1930 | 1.0000 | 60.8 | 1.032 |
| 14 | 13.34 | 371.0 | 0.1920 | 1.0000 | 63.4 | 1.034 |
| 15 | 13.83 | 375.9 | 0.1910 | 1.0000 | 66.0 | 1.035 |
| 16 | 14.36 | 381.2 | 0.1901 | 0.9999 | 68.8 | 1.037 |
| 17 | 14.89 | 386.4 | 0.1892 | 0.9999 | 71.5 | 1.039 |
| 18 | 15.39 | 391.5 | 0.1884 | 0.9999 | 74.2 | 1.040 |
| 19 | 15.81 | 395.7 | 0.1878 | 0.9999 | 76.4 | 1.042 |
| 20 | 16.26 | 400.2 | 0.1872 | 0.9999 | 78.7 | 1.043 |
| 21 | 16.74 | 405.0 | 0.1867 | 0.9998 | 81.2 | 1.045 |
| 22 | 17.35 | 411.3 | 0.1861 | 0.9998 | 84.3 | 1.047 |
| 23 | 17.80 | 415.9 | 0.1857 | 0.9998 | 86.6 | 1.049 |
| 24 | 18.22 | 420.2 | 0.1854 | 0.9997 | 88.7 | 1.051 |
| 25 | 18.69 | 424.9 | 0.1851 | 0.9997 | 91.0 | 1.052 |
| 26 | 19.26 | 430.8 | 0.1848 | 0.9996 | 93.8 | 1.055 |
| 27 | 19.70 | 435.4 | 0.1846 | 0.9995 | 95.9 | 1.057 |
| 28 | 20.13 | 439.8 | 0.1845 | 0.9994 | 98.0 | 1.059 |
| 29 | 20.61 | 444.8 | 0.1845 | 0.9993 | 100.2 | 1.061 |
| 30 | 21.14 | 450.4 | 0.1845 | 0.9992 | 102.6 | 1.063 |
| 31 | 21.58 | 455.0 | 0.1845 | 0.9991 | 104.6 | 1.066 |
| 32 | 22.04 | 459.8 | 0.1846 | 0.9990 | 106.6 | 1.068 |
| 33 | 22.58 | 465.6 | 0.1849 | 0.9988 | 108.9 | 1.071 |
| 34 | 22.96 | 469.7 | 0.1851 | 0.9987 | 110.4 | 1.073 |
| 35 | 23.45 | 474.8 | 0.1854 | 0.9986 | 112.4 | 1.076 |
| 36 | 23.84 | 478.9 | 0.1856 | 0.9984 | 113.9 | 1.078 |
| *37* | *24.33* | *484.1* | *0.1860* | *0.9982* | *115.7* | *1.082* |
| 38 | 24.79 | 489.1 | 0.1865 | 0.9980 | 117.3 | 1.085 |
| 39 | 25.28 | 494.3 | 0.1870 | 0.9978 | 119.0 | 1.088 |
| 40 | 25.70 | 498.7 | 0.1875 | 0.9975 | 120.4 | 1.091 |
| 41 | 26.12 | 503.1 | 0.1880 | 0.9973 | 121.7 | 1.095 |
| 42 | 26.58 | 508.0 | 0.1887 | 0.9971 | 123.1 | 1.099 |
| 43 | 27.14 | 513.7 | 0.1895 | 0.9967 | 124.7 | 1.103 |

**Table A23.**

solute; $C_3H_8$ 0.426 (mol)

solvent; $C_{16}H_{34}$: 1.894 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 2.05 | 302.0 | 0.1720 | 1.0000 | 11.5 | 1.003 |
| 2 | 2.20 | 306.1 | 0.1713 | 1.0000 | 12.4 | 1.004 |
| 3 | 2.37 | 310.7 | 0.1706 | 1.0000 | 13.4 | 1.004 |
| 4 | 2.55 | 315.4 | 0.1698 | 1.0000 | 14.4 | 1.005 |
| 5 | 2.77 | 320.6 | 0.1690 | 1.0000 | 15.7 | 1.006 |
| 6 | 3.01 | 326.1 | 0.1680 | 1.0000 | 17.1 | 1.006 |
| 7 | 3.20 | 330.4 | 0.1672 | 1.0000 | 18.3 | 1.007 |
| 8 | 3.45 | 335.9 | 0.1663 | 1.0000 | 19.8 | 1.008 |
| 9 | 3.71 | 341.1 | 0.1654 | 1.0000 | 21.3 | 1.009 |
| 10 | 3.98 | 346.7 | 0.1644 | 1.0000 | 23.0 | 1.009 |
| 11 | 4.19 | 350.7 | 0.1637 | 1.0000 | 24.2 | 1.010 |
| 12 | 4.46 | 356.0 | 0.1628 | 1.0000 | 25.9 | 1.011 |
| 13 | 4.75 | 361.4 | 0.1619 | 1.0000 | 27.7 | 1.012 |
| 14 | 4.98 | 365.6 | 0.1612 | 1.0000 | 29.2 | 1.013 |
| 15 | 5.31 | 371.3 | 0.1602 | 0.9999 | 31.2 | 1.014 |
| 16 | 5.56 | 375.8 | 0.1595 | 0.9999 | 32.8 | 1.014 |
| 17 | 5.90 | 381.6 | 0.1585 | 0.9999 | 34.9 | 1.016 |
| 18 | 6.14 | 385.7 | 0.1579 | 0.9999 | 36.4 | 1.016 |
| 19 | 6.49 | 391.6 | 0.1570 | 0.9998 | 38.6 | 1.018 |
| 20 | 6.75 | 396.0 | 0.1564 | 0.9998 | 40.3 | 1.018 |
| 21 | 7.05 | 401.0 | 0.1557 | 0.9998 | 42.2 | 1.020 |
| 22 | 7.38 | 406.2 | 0.1550 | 0.9997 | 44.3 | 1.021 |
| 23 | 7.63 | 410.4 | 0.1545 | 0.9997 | 46.0 | 1.022 |
| 24 | 7.93 | 415.2 | 0.1539 | 0.9996 | 47.9 | 1.023 |
| 25 | 8.22 | 419.8 | 0.1534 | 0.9995 | 49.8 | 1.024 |
| 26 | 8.55 | 424.9 | 0.1528 | 0.9994 | 51.9 | 1.025 |
| 27 | 8.88 | 430.1 | 0.1523 | 0.9993 | 54.0 | 1.026 |
| 28 | 9.19 | 434.9 | 0.1518 | 0.9992 | 56.0 | 1.027 |
| 29 | 9.54 | 440.3 | 0.1513 | 0.9991 | 58.2 | 1.029 |
| 30 | 9.94 | 446.5 | 0.1508 | 0.9989 | 60.8 | 1.031 |
| 31 | 10.22 | 450.7 | 0.1505 | 0.9988 | 62.5 | 1.032 |
| 32 | 10.52 | 455.4 | 0.1502 | 0.9986 | 64.4 | 1.033 |
| 33 | 10.86 | 460.4 | 0.1499 | 0.9984 | 66.5 | 1.035 |
| 34 | 11.17 | 465.2 | 0.1497 | 0.9982 | 68.5 | 1.036 |
| 35 | 11.50 | 470.1 | 0.1495 | 0.9980 | 70.4 | 1.038 |
| 36 | 11.80 | 474.6 | 0.1493 | 0.9977 | 72.3 | 1.039 |
| 37 | 12.17 | 480.3 | 0.1492 | 0.9974 | 74.4 | 1.041 |
| 38 | 12.48 | 484.8 | 0.1491 | 0.9971 | 76.3 | 1.043 |
| 39 | 12.79 | 489.5 | 0.1491 | 0.9968 | 78.1 | 1.045 |
| 40 | 13.11 | 494.2 | 0.1490 | 0.9965 | 79.9 | 1.047 |
| 41 | 13.47 | 499.5 | 0.1491 | 0.9961 | 82.0 | 1.049 |
| 42 | 13.83 | 504.7 | 0.1491 | 0.9957 | 83.9 | 1.051 |
| 43 | 14.15 | 509.4 | 0.1493 | 0.9953 | 85.6 | 1.053 |
| 44 | 14.46 | 513.9 | 0.1494 | 0.9948 | 87.2 | 1.056 |

**Table A24.**

solute; $C_5H_{12}$: 0.379 mol

solvent; $C_{16}H_{34}$: 2.018 mol

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.12 | 396.3 | 0.1545 | 0.9992 | 7.1 | 1.000 |
| 2 | 1.23 | 401.7 | 0.1543 | 0.9991 | 7.8 | 1.001 |
| 3 | 1.34 | 406.9 | 0.1540 | 0.9989 | 8.5 | 1.001 |
| 4 | 1.43 | 411.2 | 0.1538 | 0.9988 | 9.0 | 1.002 |
| 5 | 1.56 | 416.5 | 0.1536 | 0.9986 | 9.9 | 1.002 |
| 6 | 1.69 | 421.9 | 0.1533 | 0.9983 | 10.7 | 1.003 |
| 7 | 1.83 | 427.3 | 0.1530 | 0.9981 | 11.5 | 1.003 |
| 8 | 1.96 | 432.1 | 0.1528 | 0.9978 | 12.4 | 1.004 |
| 9 | 2.10 | 437.1 | 0.1525 | 0.9975 | 13.3 | 1.005 |
| 10 | 2.24 | 441.7 | 0.1523 | 0.9972 | 14.2 | 1.005 |
| 11 | 2.39 | 446.8 | 0.1520 | 0.9968 | 15.1 | 1.006 |
| 12 | 2.53 | 451.8 | 0.1518 | 0.9964 | 16.0 | 1.006 |
| 13 | 2.70 | 457.1 | 0.1516 | 0.9960 | 17.0 | 1.007 |
| 14 | 2.86 | 462.2 | 0.1514 | 0.9955 | 18.0 | 1.008 |
| 15 | 3.02 | 467.0 | 0.1512 | 0.9950 | 19.0 | 1.009 |
| 16 | 3.21 | 472.4 | 0.1510 | 0.9944 | 20.2 | 1.009 |
| 17 | 3.39 | 477.4 | 0.1508 | 0.9939 | 21.3 | 1.010 |
| 18 | 3.57 | 482.2 | 0.1506 | 0.9933 | 22.4 | 1.011 |
| 19 | 3.74 | 486.7 | 0.1505 | 0.9927 | 23.4 | 1.012 |
| 20 | 3.96 | 492.5 | 0.1503 | 0.9919 | 24.8 | 1.013 |
| 21 | 4.13 | 496.8 | 0.1502 | 0.9913 | 25.8 | 1.014 |
| 22 | 4.36 | 502.3 | 0.1501 | 0.9904 | 27.2 | 1.015 |
| 23 | 4.53 | 506.6 | 0.1500 | 0.9897 | 28.3 | 1.016 |
| 24 | 4.72 | 510.8 | 0.1499 | 0.9890 | 29.4 | 1.017 |

**Table A25.**

solute; $C_6H_{14}$: 0.223 (mol)

solvent; $C_{16}H_{34}$: 1.961 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.05 | 459.7 | 0.0988 | 0.9894 | 10.3 | 1.000 |
| 2 | 1.12 | 465.3 | 0.0987 | 0.9881 | 11.0 | 1.001 |
| 3 | 1.21 | 470.4 | 0.0985 | 0.9870 | 11.9 | 1.001 |
| 4 | 1.30 | 475.4 | 0.0984 | 0.9859 | 12.7 | 1.001 |
| 5 | 1.39 | 480.3 | 0.0982 | 0.9848 | 13.6 | 1.002 |
| 6 | 1.49 | 485.4 | 0.0980 | 0.9835 | 14.6 | 1.002 |
| 7 | 1.59 | 490.3 | 0.0979 | 0.9823 | 15.5 | 1.003 |
| 8 | 1.70 | 495.2 | 0.0977 | 0.9811 | 16.6 | 1.003 |
| 9 | 1.81 | 500.1 | 0.0975 | 0.9798 | 17.7 | 1.004 |
| 10 | 1.94 | 505.5 | 0.0973 | 0.9783 | 18.9 | 1.005 |
| 11 | 2.06 | 510.4 | 0.0972 | 0.9769 | 20.1 | 1.005 |
| 12 | 2.19 | 515.5 | 0.0970 | 0.9754 | 21.3 | 1.006 |
| 13 | 2.33 | 520.5 | 0.0969 | 0.9740 | 22.6 | 1.007 |
| 14 | 2.46 | 525.0 | 0.0967 | 0.9727 | 23.9 | 1.007 |

**Table A26.**

solute; $CH_3OH$: 0.164 (mol)

solvent; $C_{16}H_{34}$: 2.098 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 1.05 | 346.1 | 0.0675 | 1.0000 | 15.3 | 1.000 |
| 2 | 1.05 | 351.3 | 0.0676 | 0.9999 | 15.2 | 1.000 |
| 3 | 1.09 | 355.6 | 0.0675 | 0.9999 | 15.8 | 1.000 |
| 4 | 1.40 | 368.8 | 0.0664 | 0.9998 | 20.7 | 1.001 |
| 5 | 1.74 | 383.8 | 0.0653 | 0.9997 | 26.0 | 1.002 |
| 6 | 2.00 | 395.1 | 0.0647 | 0.9995 | 30.1 | 1.002 |
| 7 | 2.12 | 400.7 | 0.0644 | 0.9994 | 32.0 | 1.003 |
| 8 | 2.24 | 405.7 | 0.0641 | 0.9993 | 34.0 | 1.003 |
| 9 | 2.36 | 410.4 | 0.0638 | 0.9992 | 35.9 | 1.003 |
| 10 | 2.46 | 415.1 | 0.0636 | 0.9990 | 37.6 | 1.004 |
| 11 | 2.59 | 420.6 | 0.0634 | 0.9988 | 39.7 | 1.004 |
| 12 | 2.72 | 425.7 | 0.0631 | 0.9986 | 41.9 | 1.004 |
| 13 | 2.84 | 430.3 | 0.0629 | 0.9984 | 43.8 | 1.005 |
| 14 | 2.98 | 435.5 | 0.0627 | 0.9981 | 46.0 | 1.005 |
| 15 | 3.11 | 440.6 | 0.0625 | 0.9978 | 48.2 | 1.005 |
| 16 | 3.23 | 445.5 | 0.0623 | 0.9975 | 50.1 | 1.006 |
| 17 | 3.35 | 450.2 | 0.0622 | 0.9972 | 52.1 | 1.006 |
| 18 | 3.49 | 455.5 | 0.0620 | 0.9967 | 54.4 | 1.007 |
| 19 | 3.60 | 460.0 | 0.0619 | 0.9963 | 56.2 | 1.007 |
| 20 | 3.72 | 464.5 | 0.0618 | 0.9959 | 58.0 | 1.007 |
| 21 | 3.83 | 469.4 | 0.0618 | 0.9954 | 59.6 | 1.008 |
| 22 | 3.94 | 474.4 | 0.0618 | 0.9948 | 61.5 | 1.008 |
| 23 | 4.07 | 479.5 | 0.0617 | 0.9941 | 63.4 | 1.009 |
| 24 | 4.19 | 484.6 | 0.0617 | 0.9934 | 65.3 | 1.009 |
| 25 | 4.29 | 488.8 | 0.0617 | 0.9928 | 66.7 | 1.010 |
| 26 | 4.35 | 492.9 | 0.0618 | 0.9921 | 67.4 | 1.010 |
| 27 | 4.40 | 496.8 | 0.0620 | 0.9913 | 68.1 | 1.010 |
| 28 | 4.48 | 500.9 | 0.0621 | 0.9906 | 69.1 | 1.010 |
| 29 | 4.55 | 504.9 | 0.0622 | 0.9897 | 70.0 | 1.011 |
| 30 | 4.64 | 509.2 | 0.0622 | 0.9889 | 71.3 | 1.011 |

**Table A27.**

solute; $C_2H_5OH$: 0.129 (mol)

solvent; $C_{16}H_{34}$: 1.864 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.66 | 373.1 | 0.0605 | 0.9996 | 10.8 | 0.999 |
| 2 | 0.72 | 377.4 | 0.0603 | 0.9995 | 11.8 | 0.999 |
| 3 | 0.77 | 381.7 | 0.0600 | 0.9994 | 12.7 | 0.999 |
| 4 | 0.83 | 386.7 | 0.0597 | 0.9993 | 13.7 | 1.000 |
| 5 | 0.90 | 391.9 | 0.0595 | 0.9992 | 14.9 | 1.000 |
| 6 | 0.96 | 396.6 | 0.0592 | 0.9990 | 16.0 | 1.000 |
| 7 | 1.04 | 402.2 | 0.0589 | 0.9988 | 17.4 | 1.000 |
| 8 | 1.11 | 407.8 | 0.0586 | 0.9986 | 18.7 | 1.000 |
| 9 | 1.18 | 412.4 | 0.0584 | 0.9983 | 19.8 | 1.000 |
| 10 | 1.25 | 417.0 | 0.0581 | 0.9981 | 21.1 | 1.001 |
| 11 | 1.32 | 422.4 | 0.0578 | 0.9977 | 22.5 | 1.001 |
| 12 | 1.39 | 427.2 | 0.0576 | 0.9973 | 23.7 | 1.001 |
| 13 | 1.48 | 432.3 | 0.0574 | 0.9969 | 25.2 | 1.001 |
| 14 | 1.55 | 437.0 | 0.0572 | 0.9965 | 26.5 | 1.002 |
| 15 | 1.62 | 441.6 | 0.0569 | 0.9960 | 27.9 | 1.002 |
| 16 | 1.71 | 447.0 | 0.0567 | 0.9954 | 29.4 | 1.002 |
| 17 | 1.78 | 451.0 | 0.0565 | 0.9949 | 30.7 | 1.002 |
| 18 | 1.86 | 455.9 | 0.0563 | 0.9943 | 32.2 | 1.003 |
| 19 | 1.94 | 461.5 | 0.0561 | 0.9934 | 33.7 | 1.003 |
| 20 | 2.02 | 465.6 | 0.0559 | 0.9928 | 35.1 | 1.003 |
| 21 | 2.12 | 470.9 | 0.0557 | 0.9919 | 36.9 | 1.003 |
| 22 | 2.23 | 476.4 | 0.0555 | 0.9909 | 38.9 | 1.004 |
| 23 | 2.32 | 481.2 | 0.0553 | 0.9899 | 40.7 | 1.004 |
| 24 | 2.41 | 485.4 | 0.0551 | 0.9891 | 42.3 | 1.004 |
| 25 | 2.52 | 490.6 | 0.0549 | 0.9879 | 44.3 | 1.005 |
| 26 | 2.63 | 495.6 | 0.0547 | 0.9868 | 46.3 | 1.005 |
| 27 | 2.75 | 501.1 | 0.0545 | 0.9854 | 48.5 | 1.006 |
| 28 | 2.85 | 505.4 | 0.0543 | 0.9843 | 50.3 | 1.006 |
| 29 | 2.97 | 510.6 | 0.0542 | 0.9829 | 52.6 | 1.007 |
| 30 | 3.09 | 515.5 | 0.0540 | 0.9816 | 54.8 | 1.007 |

**Table A28.**

solute; $C_3H_7OH$: 0.151 (mol)

solvent; $C_{16}H_{34}$: 1.872 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.35 | 372.1 | 0.0726 | 0.9993 | 4.7 | 0.998 |
| 2 | 0.38 | 376.2 | 0.0725 | 0.9992 | 5.1 | 0.998 |
| 3 | 0.43 | 382.2 | 0.0722 | 0.9990 | 5.9 | 0.998 |
| 4 | 0.47 | 386.9 | 0.0720 | 0.9989 | 6.4 | 0.998 |
| 5 | 0.52 | 392.7 | 0.0718 | 0.9986 | 7.2 | 0.998 |
| 6 | 0.56 | 396.9 | 0.0716 | 0.9984 | 7.8 | 0.999 |
| 7 | 0.62 | 402.0 | 0.0714 | 0.9981 | 8.5 | 0.999 |
| 8 | 0.67 | 407.2 | 0.0712 | 0.9978 | 9.3 | 0.999 |
| 9 | 0.72 | 411.9 | 0.0710 | 0.9974 | 10.0 | 0.999 |
| 10 | 0.79 | 417.3 | 0.0708 | 0.9970 | 10.9 | 0.999 |
| 11 | 0.84 | 422.0 | 0.0706 | 0.9966 | 11.7 | 0.999 |
| 12 | 0.90 | 426.9 | 0.0704 | 0.9961 | 12.6 | 1.000 |
| 13 | 0.97 | 431.9 | 0.0701 | 0.9956 | 13.6 | 1.000 |
| 14 | 1.02 | 435.8 | 0.0700 | 0.9951 | 14.3 | 1.000 |
| 15 | 1.10 | 441.7 | 0.0697 | 0.9943 | 15.4 | 1.000 |
| 16 | 1.17 | 446.3 | 0.0695 | 0.9937 | 16.4 | 1.001 |
| 17 | 1.24 | 451.1 | 0.0693 | 0.9930 | 17.5 | 1.001 |
| 18 | 1.30 | 455.8 | 0.0691 | 0.9921 | 18.4 | 1.001 |
| 19 | 1.39 | 461.5 | 0.0689 | 0.9911 | 19.7 | 1.001 |
| 20 | 1.48 | 466.3 | 0.0687 | 0.9902 | 20.9 | 1.002 |
| 21 | 1.56 | 471.2 | 0.0685 | 0.9892 | 22.1 | 1.002 |
| 22 | 1.65 | 476.1 | 0.0682 | 0.9882 | 23.4 | 1.002 |
| 23 | 1.74 | 480.5 | 0.0680 | 0.9873 | 24.7 | 1.002 |
| 24 | 1.84 | 485.6 | 0.0678 | 0.9860 | 26.1 | 1.003 |
| 25 | 1.95 | 491.2 | 0.0676 | 0.9846 | 27.8 | 1.003 |
| 26 | 2.05 | 495.9 | 0.0674 | 0.9834 | 29.3 | 1.004 |
| 27 | 2.15 | 500.2 | 0.0672 | 0.9823 | 30.7 | 1.004 |
| 28 | 2.27 | 505.3 | 0.0669 | 0.9809 | 32.4 | 1.005 |
| 29 | 2.40 | 510.6 | 0.0667 | 0.9794 | 34.3 | 1.005 |
| 30 | 2.54 | 516.1 | 0.0665 | 0.9778 | 36.3 | 1.006 |

**Table A29.**

solute; $C_4H_9OH$: 0.205 (mol)

solvent; $C_{16}H_{34}$: 2.058 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.82 | 434.1 | 0.0879 | 0.9944 | 9.1 | 0.999 |
| 2 | 0.82 | 438.7 | 0.0879 | 0.9934 | 9.1 | 0.999 |
| 3 | 0.82 | 443.8 | 0.0880 | 0.9921 | 9.1 | 0.999 |
| 4 | 0.88 | 448.8 | 0.0879 | 0.9912 | 9.7 | 1.000 |
| 5 | 0.95 | 453.3 | 0.0877 | 0.9904 | 10.5 | 1.000 |
| 6 | 1.02 | 458.2 | 0.0876 | 0.9895 | 11.3 | 1.000 |
| 7 | 1.09 | 463.0 | 0.0875 | 0.9885 | 12.1 | 1.000 |
| 8 | 1.12 | 467.1 | 0.0874 | 0.9873 | 12.4 | 1.000 |
| 9 | 1.10 | 472.7 | 0.0876 | 0.9847 | 12.1 | 1.000 |
| 10 | 1.22 | 477.9 | 0.0874 | 0.9839 | 13.5 | 1.001 |
| 11 | 1.37 | 482.6 | 0.0871 | 0.9834 | 15.1 | 1.001 |
| 12 | 1.45 | 487.7 | 0.0870 | 0.9819 | 16.0 | 1.002 |
| 13 | 1.55 | 492.6 | 0.0868 | 0.9807 | 17.1 | 1.002 |
| 14 | 1.67 | 496.9 | 0.0866 | 0.9798 | 18.4 | 1.003 |
| 15 | 1.76 | 500.5 | 0.0865 | 0.9789 | 19.4 | 1.003 |
| 16 | 1.96 | 507.3 | 0.0863 | 0.9773 | 21.6 | 1.004 |
| 17 | 2.10 | 512.2 | 0.0861 | 0.9762 | 23.1 | 1.004 |
| 18 | 2.25 | 516.8 | 0.0859 | 0.9750 | 24.7 | 1.005 |
| 19 | 2.37 | 521.6 | 0.0858 | 0.9735 | 26.1 | 1.005 |
| 20 | 2.54 | 526.7 | 0.0857 | 0.9722 | 27.8 | 1.006 |

**Table A30.**

solute; $C_5H_{11}OH$: 0.118 (mol)

solvent; $C_{16}H_{34}$: 1.665 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.32 | 421.6 | 0.0642 | 0.9915 | 1.3 | 0.997 |
| 2 | 0.35 | 426.6 | 0.0641 | 0.9904 | 1.4 | 0.997 |
| 3 | 0.37 | 431.2 | 0.0640 | 0.9892 | 1.5 | 0.998 |
| 4 | 0.40 | 435.9 | 0.0638 | 0.9880 | 1.6 | 0.998 |
| 5 | 0.44 | 441.7 | 0.0637 | 0.9864 | 1.7 | 0.998 |
| 6 | 0.47 | 446.3 | 0.0635 | 0.9851 | 1.8 | 0.998 |
| 7 | 0.51 | 451.3 | 0.0633 | 0.9835 | 1.9 | 0.998 |
| 8 | 0.55 | 456.5 | 0.0632 | 0.9818 | 2.0 | 0.998 |
| 9 | 0.59 | 461.1 | 0.0630 | 0.9803 | 2.2 | 0.998 |
| 10 | 0.64 | 465.7 | 0.0628 | 0.9787 | 2.5 | 0.999 |
| 11 | 0.68 | 470.7 | 0.0626 | 0.9769 | 2.9 | 0.999 |
| 12 | 0.74 | 475.7 | 0.0624 | 0.9750 | 3.1 | 0.999 |
| 13 | 0.80 | 481.1 | 0.0622 | 0.9729 | 3.3 | 0.999 |
| 14 | 0.86 | 486.1 | 0.0619 | 0.9710 | 3.6 | 0.999 |
| 15 | 0.92 | 491.2 | 0.0617 | 0.9690 | 3.8 | 1.000 |
| 16 | 0.99 | 495.9 | 0.0615 | 0.9671 | 4.2 | 1.000 |
| 17 | 1.06 | 501.0 | 0.0612 | 0.9651 | 4.6 | 1.000 |
| 18 | 1.14 | 506.0 | 0.0609 | 0.9631 | 4.9 | 1.001 |
| 19 | 1.23 | 511.0 | 0.0606 | 0.9611 | 5.3 | 1.001 |
| 20 | 1.32 | 516.2 | 0.0603 | 0.9590 | 5.7 | 1.001 |

**Table A31.**

solute; $C_6H_{13}OH$: 0.077 (mol)

solvent; $C_{16}H_{34}$: 1.506 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.32 | 462.4 | 0.0464 | 0.9615 | 0.9 | 0.997 |
| 2 | 0.34 | 467.4 | 0.0462 | 0.9584 | 1.0 | 0.997 |
| 3 | 0.37 | 472.0 | 0.0461 | 0.9556 | 1.0 | 0.997 |
| 4 | 0.40 | 477.1 | 0.0459 | 0.9524 | 1.1 | 0.997 |
| 5 | 0.43 | 481.7 | 0.0457 | 0.9495 | 1.4 | 0.998 |
| 6 | 0.47 | 487.0 | 0.0455 | 0.9463 | 1.5 | 0.998 |
| 7 | 0.51 | 491.8 | 0.0453 | 0.9436 | 1.6 | 0.998 |
| 8 | 0.55 | 496.8 | 0.0451 | 0.9406 | 1.6 | 0.998 |
| 9 | 0.60 | 501.3 | 0.0449 | 0.9384 | 1.7 | 0.998 |
| 10 | 0.66 | 506.6 | 0.0446 | 0.9357 | 1.8 | 0.998 |
| 11 | 0.72 | 511.4 | 0.0443 | 0.9334 | 1.9 | 0.999 |
| 12 | 0.79 | 516.7 | 0.0440 | 0.9313 | 2.0 | 0.999 |

**Table A32.**

solute; $H_2O$: 0.145 (mol)

solvent; $C_{16}H_{34}$: 1.952 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 2.68 | 413.5 | 0.0567 | 0.9992 | 46.2 | 1.003 |
| 2 | 2.92 | 418.4 | 0.0557 | 0.9990 | 51.2 | 1.003 |
| 3 | 3.25 | 423.3 | 0.0545 | 0.9989 | 58.2 | 1.004 |
| 4 | 3.35 | 428.1 | 0.0543 | 0.9987 | 60.1 | 1.004 |
| 5 | 3.47 | 433.3 | 0.0541 | 0.9985 | 62.4 | 1.005 |
| 6 | 3.59 | 437.7 | 0.0539 | 0.9983 | 64.8 | 1.005 |
| 7 | 3.73 | 443.2 | 0.0536 | 0.9980 | 67.6 | 1.005 |
| 8 | 3.87 | 447.9 | 0.0534 | 0.9977 | 70.4 | 1.006 |
| 9 | 4.02 | 452.7 | 0.0530 | 0.9974 | 73.6 | 1.006 |
| 10 | 4.17 | 457.7 | 0.0528 | 0.9970 | 76.7 | 1.006 |
| 11 | 4.29 | 462.7 | 0.0526 | 0.9966 | 79.1 | 1.007 |
| 12 | 4.41 | 467.6 | 0.0526 | 0.9962 | 81.2 | 1.007 |
| 13 | 4.52 | 472.4 | 0.0525 | 0.9957 | 83.5 | 1.007 |
| 14 | 4.65 | 477.2 | 0.0524 | 0.9952 | 85.9 | 1.008 |
| 15 | 4.78 | 482.1 | 0.0523 | 0.9946 | 88.3 | 1.008 |
| 16 | 4.94 | 487.1 | 0.0521 | 0.9940 | 91.5 | 1.009 |
| 17 | 5.08 | 491.9 | 0.0520 | 0.9933 | 94.2 | 1.009 |
| 18 | 5.55 | 496.7 | 0.0508 | 0.9929 | 105.0 | 1.011 |
| 19 | 5.68 | 501.6 | 0.0508 | 0.9922 | 107.4 | 1.011 |
| 20 | 5.81 | 506.2 | 0.0508 | 0.9915 | 109.6 | 1.012 |
| 21 | 5.96 | 511.2 | 0.0508 | 0.9906 | 112.4 | 1.012 |
| 22 | 6.11 | 516.2 | 0.0508 | 0.9897 | 114.9 | 1.013 |
| 23 | 6.26 | 521.2 | 0.0509 | 0.9887 | 117.4 | 1.014 |
| 24 | 6.39 | 525.5 | 0.0509 | 0.9879 | 119.6 | 1.015 |

**Table A33.**

solute; CO: 0.578 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 31.16 | 372.2 | 0.0507 | 1.0000 | 578.5 | 1.064 |
| 2 | 31.44 | 376.3 | 0.0519 | 1.0000 | 569.7 | 1.065 |
| 3 | 31.84 | 380.7 | 0.0522 | 1.0000 | 573.3 | 1.066 |
| 4 | 32.30 | 385.7 | 0.0526 | 1.0000 | 577.6 | 1.068 |
| 5 | 32.65 | 389.7 | 0.0531 | 1.0000 | 577.2 | 1.069 |
| 6 | 33.08 | 395.3 | 0.0543 | 1.0000 | 572.1 | 1.070 |
| 7 | 33.53 | 400.8 | 0.0552 | 0.9999 | 569.6 | 1.072 |
| 8 | 33.92 | 405.5 | 0.0559 | 0.9999 | 568.8 | 1.073 |
| 9 | 34.35 | 410.4 | 0.0564 | 0.9999 | 570.1 | 1.075 |
| 10 | 34.80 | 415.2 | 0.0568 | 0.9999 | 572.9 | 1.076 |
| 11 | 35.25 | 420.3 | 0.0574 | 0.9999 | 574.0 | 1.078 |
| 12 | 35.74 | 425.7 | 0.0580 | 0.9998 | 574.7 | 1.080 |
| 13 | 36.14 | 430.4 | 0.0588 | 0.9998 | 573.4 | 1.081 |
| 14 | 36.53 | 434.9 | 0.0594 | 0.9998 | 572.4 | 1.083 |
| 15 | 37.00 | 440.4 | 0.0602 | 0.9997 | 571.2 | 1.085 |
| 16 | 37.45 | 445.6 | 0.0610 | 0.9996 | 569.7 | 1.087 |
| 17 | 37.87 | 450.1 | 0.0615 | 0.9996 | 571.2 | 1.089 |
| 18 | 38.34 | 455.0 | 0.0620 | 0.9995 | 572.8 | 1.091 |
| 19 | 38.79 | 460.1 | 0.0626 | 0.9994 | 572.3 | 1.093 |
| 20 | 39.19 | 464.5 | 0.0633 | 0.9992 | 571.3 | 1.095 |
| 21 | 39.62 | 469.9 | 0.0644 | 0.9991 | 566.4 | 1.098 |
| 22 | 39.99 | 474.3 | 0.0653 | 0.9989 | 563.2 | 1.100 |
| 23 | 40.51 | 480.0 | 0.0660 | 0.9987 | 562.7 | 1.102 |
| 24 | 40.96 | 484.7 | 0.0666 | 0.9985 | 562.6 | 1.105 |
| 25 | 41.40 | 489.6 | 0.0674 | 0.9982 | 560.8 | 1.108 |
| 26 | 41.82 | 494.7 | 0.0685 | 0.9979 | 556.2 | 1.110 |
| 27 | 42.20 | 499.4 | 0.0697 | 0.9976 | 550.3 | 1.113 |
| 28 | 42.60 | 504.8 | 0.0711 | 0.9971 | 542.7 | 1.116 |
| 29 | 43.00 | 509.5 | 0.0722 | 0.9967 | 538.4 | 1.119 |
| 30 | 43.45 | 514.7 | 0.0732 | 0.9961 | 534.5 | 1.122 |

**Table A34.**

solute; $CO_2$: 0.529 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 18.74 | 372.6 | 0.1215 | 1.0000 | 141.6 | 1.036 |
| 2 | 19.09 | 376.6 | 0.1207 | 1.0000 | 145.3 | 1.037 |
| 3 | 19.47 | 380.7 | 0.1198 | 1.0000 | 149.2 | 1.038 |
| 4 | 19.89 | 385.6 | 0.1191 | 1.0000 | 153.4 | 1.039 |
| 5 | 20.26 | 390.4 | 0.1187 | 0.9999 | 156.8 | 1.040 |
| 6 | 20.56 | 394.8 | 0.1186 | 0.9999 | 159.3 | 1.041 |
| 7 | 20.91 | 399.7 | 0.1185 | 0.9999 | 162.1 | 1.042 |
| 8 | 21.22 | 403.8 | 0.1183 | 0.9999 | 164.9 | 1.043 |
| 9 | 21.72 | 410.5 | 0.1181 | 0.9998 | 169.0 | 1.044 |
| 10 | 22.04 | 415.0 | 0.1181 | 0.9998 | 171.6 | 1.045 |
| 11 | 22.40 | 419.8 | 0.1180 | 0.9998 | 174.5 | 1.047 |
| 12 | 22.72 | 424.1 | 0.1179 | 0.9997 | 177.2 | 1.048 |
| 13 | 22.97 | 429.5 | 0.1189 | 0.9996 | 177.7 | 1.049 |
| 14 | 23.38 | 435.0 | 0.1189 | 0.9996 | 180.8 | 1.050 |
| 15 | 23.76 | 439.7 | 0.1187 | 0.9995 | 184.0 | 1.051 |
| 16 | 24.25 | 445.7 | 0.1184 | 0.9993 | 188.1 | 1.053 |
| 17 | 24.61 | 450.3 | 0.1183 | 0.9992 | 190.9 | 1.054 |
| 18 | 25.01 | 455.5 | 0.1183 | 0.9990 | 193.9 | 1.056 |
| 19 | 25.39 | 460.4 | 0.1183 | 0.9988 | 196.7 | 1.058 |
| 20 | 25.73 | 464.6 | 0.1183 | 0.9986 | 199.3 | 1.059 |
| 21 | 26.16 | 469.8 | 0.1181 | 0.9984 | 202.7 | 1.061 |
| 22 | 26.60 | 475.1 | 0.1180 | 0.9980 | 206.0 | 1.063 |
| 23 | 27.02 | 480.7 | 0.1183 | 0.9976 | 208.6 | 1.065 |
| 24 | 27.32 | 484.6 | 0.1185 | 0.9973 | 210.3 | 1.066 |
| 25 | 27.70 | 489.6 | 0.1187 | 0.9969 | 212.6 | 1.068 |
| 26 | 28.13 | 495.1 | 0.1190 | 0.9963 | 215.1 | 1.070 |
| 27 | 28.49 | 499.3 | 0.1190 | 0.9958 | 217.3 | 1.072 |
| 28 | 28.94 | 504.9 | 0.1193 | 0.9950 | 219.9 | 1.074 |
| 29 | 29.31 | 509.4 | 0.1194 | 0.9943 | 221.9 | 1.076 |
| 30 | 29.79 | 515.6 | 0.1199 | 0.9932 | 224.1 | 1.079 |

**Table A35.**

solute; $H_2$: 0.626 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 34.82 | 372.1 | 0.0466 | 1.0000 | 710.8 | 1.062 |
| 2 | 35.24 | 376.3 | 0.0469 | 1.0000 | 713.3 | 1.064 |
| 3 | 35.67 | 380.9 | 0.0475 | 1.0000 | 713.1 | 1.065 |
| 4 | 36.12 | 385.8 | 0.0482 | 1.0000 | 710.4 | 1.066 |
| 5 | 36.61 | 391.2 | 0.0490 | 1.0000 | 706.4 | 1.068 |
| 6 | 37.05 | 395.6 | 0.0493 | 1.0000 | 710.5 | 1.069 |
| 7 | 37.48 | 399.9 | 0.0497 | 1.0000 | 712.4 | 1.071 |
| 8 | 37.94 | 404.5 | 0.0501 | 1.0000 | 714.1 | 1.072 |
| 9 | 38.51 | 410.0 | 0.0505 | 0.9999 | 718.4 | 1.074 |
| 10 | 39.02 | 415.3 | 0.0510 | 0.9999 | 718.6 | 1.076 |
| 11 | 39.52 | 420.3 | 0.0515 | 0.9999 | 719.6 | 1.077 |
| 12 | 39.99 | 425.2 | 0.0522 | 0.9999 | 717.6 | 1.079 |
| 13 | 40.44 | 429.9 | 0.0529 | 0.9999 | 715.8 | 1.081 |
| 14 | 40.95 | 435.3 | 0.0536 | 0.9998 | 712.9 | 1.083 |
| 15 | 41.44 | 440.5 | 0.0544 | 0.9998 | 709.5 | 1.085 |
| 16 | 41.89 | 445.1 | 0.0551 | 0.9997 | 708.0 | 1.087 |
| 17 | 42.38 | 450.0 | 0.0556 | 0.9997 | 707.5 | 1.089 |
| 18 | 42.87 | 454.9 | 0.0563 | 0.9996 | 706.1 | 1.091 |
| 19 | 43.36 | 459.8 | 0.0569 | 0.9995 | 704.7 | 1.093 |
| 20 | 43.88 | 465.0 | 0.0576 | 0.9994 | 702.9 | 1.096 |
| 21 | 44.37 | 469.9 | 0.0583 | 0.9993 | 700.3 | 1.098 |
| 22 | 44.81 | 474.5 | 0.0591 | 0.9991 | 696.9 | 1.100 |
| 23 | 45.35 | 480.3 | 0.0602 | 0.9989 | 690.5 | 1.103 |
| 24 | 45.80 | 485.1 | 0.0612 | 0.9987 | 684.0 | 1.106 |
| 25 | 46.24 | 490.0 | 0.0623 | 0.9985 | 677.3 | 1.108 |
| 26 | 46.61 | 494.0 | 0.0631 | 0.9983 | 671.9 | 1.111 |
| 27 | 47.20 | 500.2 | 0.0644 | 0.9979 | 664.3 | 1.114 |
| 28 | 47.60 | 504.4 | 0.0652 | 0.9976 | 659.9 | 1.117 |
| 29 | 48.08 | 509.5 | 0.0664 | 0.9972 | 653.1 | 1.120 |
| 30 | 48.61 | 514.9 | 0.0674 | 0.9967 | 647.7 | 1.123 |

**Table A36.**

solute; $C_2H_6$: 0.458 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 13.29 | 381.6 | 0.1335 | 1.0000 | 91.5 | 1.031 |
| 2 | 13.54 | 385.4 | 0.1329 | 0.9999 | 93.7 | 1.032 |
| 3 | 13.83 | 389.7 | 0.1322 | 0.9999 | 96.1 | 1.033 |
| 4 | 14.10 | 393.9 | 0.1316 | 0.9999 | 98.5 | 1.034 |
| 5 | 14.46 | 399.2 | 0.1309 | 0.9999 | 101.5 | 1.035 |
| 6 | 14.74 | 403.6 | 0.1303 | 0.9999 | 104.0 | 1.035 |
| 7 | 15.04 | 408.2 | 0.1298 | 0.9998 | 106.5 | 1.036 |
| 8 | 15.39 | 413.6 | 0.1292 | 0.9998 | 109.5 | 1.037 |
| 9 | 15.71 | 418.2 | 0.1286 | 0.9997 | 112.2 | 1.038 |
| 10 | 16.03 | 423.2 | 0.1281 | 0.9997 | 114.9 | 1.039 |
| 11 | 16.38 | 428.5 | 0.1276 | 0.9996 | 117.9 | 1.041 |
| 12 | 16.71 | 433.3 | 0.1271 | 0.9995 | 120.7 | 1.042 |
| 13 | 17.04 | 438.4 | 0.1267 | 0.9993 | 123.5 | 1.043 |
| 14 | 17.34 | 443.0 | 0.1264 | 0.9992 | 125.9 | 1.044 |
| 15 | 17.74 | 449.1 | 0.1261 | 0.9990 | 129.1 | 1.045 |
| 16 | 17.99 | 453.2 | 0.1259 | 0.9988 | 131.1 | 1.046 |
| 17 | 18.33 | 458.5 | 0.1257 | 0.9986 | 133.7 | 1.048 |
| 18 | 18.61 | 462.8 | 0.1255 | 0.9983 | 135.8 | 1.049 |
| 19 | 18.95 | 468.1 | 0.1253 | 0.9980 | 138.4 | 1.050 |
| 20 | 19.26 | 472.9 | 0.1252 | 0.9976 | 140.7 | 1.052 |
| 21 | 19.60 | 478.2 | 0.1251 | 0.9972 | 143.1 | 1.053 |
| 22 | 19.88 | 482.6 | 0.1250 | 0.9967 | 145.1 | 1.054 |
| 23 | 20.22 | 487.8 | 0.1250 | 0.9961 | 147.4 | 1.056 |
| 24 | 20.57 | 493.4 | 0.1251 | 0.9954 | 149.7 | 1.058 |
| 25 | 20.84 | 497.5 | 0.1250 | 0.9948 | 151.5 | 1.059 |
| 26 | 21.22 | 503.3 | 0.1251 | 0.9938 | 153.9 | 1.061 |
| 27 | 21.50 | 507.7 | 0.1252 | 0.9929 | 155.6 | 1.063 |
| 28 | 21.85 | 513.0 | 0.1253 | 0.9918 | 157.7 | 1.065 |
| 29 | 22.21 | 518.1 | 0.1254 | 0.9905 | 159.7 | 1.067 |
| 30 | 22.54 | 523.0 | 0.1255 | 0.9891 | 161.6 | 1.069 |

**Table A37.**

solute; $C_3H_8$: 0.175 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 3.23 | 372.2 | 0.0708 | 0.9999 | 44.0 | 1.007 |
| 2 | 3.24 | 376.3 | 0.0710 | 0.9999 | 44.1 | 1.007 |
| 3 | 3.33 | 380.5 | 0.0707 | 0.9999 | 45.4 | 1.007 |
| 4 | 3.43 | 384.8 | 0.0702 | 0.9999 | 47.2 | 1.007 |
| 5 | 3.55 | 390.2 | 0.0697 | 0.9998 | 49.3 | 1.008 |
| 6 | 3.67 | 395.0 | 0.0691 | 0.9998 | 51.3 | 1.008 |
| 7 | 3.79 | 400.1 | 0.0687 | 0.9997 | 53.2 | 1.008 |
| 8 | 3.91 | 405.0 | 0.0682 | 0.9996 | 55.3 | 1.009 |
| 9 | 4.05 | 410.0 | 0.0675 | 0.9996 | 57.9 | 1.009 |
| 10 | 4.24 | 415.3 | 0.0666 | 0.9994 | 61.3 | 1.010 |
| 11 | 4.36 | 419.4 | 0.0661 | 0.9993 | 63.5 | 1.010 |
| 12 | 4.52 | 424.6 | 0.0654 | 0.9992 | 66.6 | 1.011 |
| 13 | 4.70 | 430.4 | 0.0647 | 0.9989 | 69.9 | 1.011 |
| 14 | 4.84 | 435.4 | 0.0641 | 0.9987 | 72.6 | 1.012 |
| 15 | 4.97 | 440.0 | 0.0637 | 0.9984 | 75.0 | 1.012 |
| 16 | 5.10 | 444.7 | 0.0633 | 0.9981 | 77.3 | 1.012 |
| 17 | 5.21 | 449.2 | 0.0630 | 0.9977 | 79.4 | 1.013 |
| 18 | 5.35 | 454.4 | 0.0626 | 0.9972 | 82.1 | 1.013 |
| 19 | 5.48 | 459.2 | 0.0623 | 0.9966 | 84.4 | 1.014 |
| 20 | 5.64 | 464.7 | 0.0618 | 0.9959 | 87.3 | 1.014 |
| 21 | 5.78 | 469.8 | 0.0615 | 0.9951 | 89.9 | 1.015 |
| 22 | 5.94 | 475.3 | 0.0611 | 0.9941 | 92.8 | 1.015 |
| 23 | 6.08 | 480.2 | 0.0608 | 0.9931 | 95.4 | 1.016 |
| 24 | 6.21 | 484.9 | 0.0605 | 0.9920 | 97.8 | 1.017 |
| 25 | 6.36 | 489.8 | 0.0602 | 0.9906 | 100.4 | 1.017 |
| 26 | 6.49 | 494.4 | 0.0600 | 0.9892 | 102.8 | 1.018 |
| 27 | 6.65 | 500.0 | 0.0597 | 0.9872 | 105.5 | 1.018 |
| 28 | 6.78 | 504.3 | 0.0595 | 0.9854 | 107.9 | 1.019 |
| 29 | 6.94 | 509.6 | 0.0593 | 0.9830 | 110.5 | 1.020 |
| 30 | 7.11 | 514.7 | 0.0590 | 0.9804 | 113.2 | 1.020 |

**Table A38.**

solute; $C_5H_{12}$: 0.090 (mol)

solvent; $C_{16}H_{33}OH$: 1.922 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.30 | 380.7 | 0.0430 | 0.9991 | 7.0 | 0.997 |
| 2 | 0.34 | 385.2 | 0.0428 | 0.9990 | 7.9 | 0.997 |
| 3 | 0.38 | 390.8 | 0.0426 | 0.9987 | 8.9 | 0.998 |
| 4 | 0.42 | 396.1 | 0.0424 | 0.9984 | 9.8 | 0.998 |
| 5 | 0.45 | 401.1 | 0.0423 | 0.9980 | 10.5 | 0.998 |
| 6 | 0.48 | 406.3 | 0.0421 | 0.9975 | 11.3 | 0.998 |
| 7 | 0.52 | 410.6 | 0.0420 | 0.9971 | 12.1 | 0.998 |
| 8 | 0.55 | 416.6 | 0.0419 | 0.9963 | 13.1 | 0.998 |
| 9 | 0.59 | 421.1 | 0.0417 | 0.9956 | 14.0 | 0.998 |
| 10 | 0.62 | 425.1 | 0.0416 | 0.9948 | 14.6 | 0.999 |
| 11 | 0.67 | 431.2 | 0.0414 | 0.9936 | 15.9 | 0.999 |
| 12 | 0.71 | 435.9 | 0.0413 | 0.9925 | 16.9 | 0.999 |
| 13 | 0.74 | 440.3 | 0.0412 | 0.9912 | 17.7 | 0.999 |
| 14 | 0.78 | 446.1 | 0.0411 | 0.9891 | 18.7 | 0.999 |
| 15 | 0.84 | 450.8 | 0.0408 | 0.9876 | 20.2 | 0.999 |
| 16 | 0.88 | 455.5 | 0.0408 | 0.9854 | 21.0 | 1.000 |
| 17 | 0.93 | 460.3 | 0.0406 | 0.9831 | 22.2 | 1.000 |
| 18 | 0.97 | 464.8 | 0.0405 | 0.9805 | 23.1 | 1.000 |
| 19 | 1.01 | 469.9 | 0.0404 | 0.9771 | 24.1 | 1.000 |
| 20 | 1.06 | 474.8 | 0.0403 | 0.9735 | 25.2 | 1.000 |
| 21 | 1.11 | 480.0 | 0.0401 | 0.9693 | 26.6 | 1.000 |
| 22 | 1.17 | 484.9 | 0.0400 | 0.9648 | 27.8 | 1.001 |
| 23 | 1.24 | 489.5 | 0.0398 | 0.9606 | 29.5 | 1.001 |
| 24 | 1.31 | 495.0 | 0.0397 | 0.9545 | 31.0 | 1.001 |
| 25 | 1.37 | 499.8 | 0.0396 | 0.9484 | 32.3 | 1.001 |
| 26 | 1.44 | 505.0 | 0.0394 | 0.9416 | 34.0 | 1.002 |
| 27 | 1.49 | 509.5 | 0.0394 | 0.9341 | 34.8 | 1.002 |
| 28 | 1.58 | 515.0 | 0.0392 | 0.9256 | 36.7 | 1.002 |

**Table A39.**

solute; $C_6H_{14}$: 0.087 (mol)

solvent; $C_{16}H_{33}OH$: 1.922 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.31 | 420.7 | 0.0418 | 0.9920 | 7.4 | 0.997 |
| 2 | 0.34 | 426.0 | 0.0417 | 0.9904 | 8.0 | 0.997 |
| 3 | 0.36 | 431.0 | 0.0416 | 0.9884 | 8.4 | 0.997 |
| 4 | 0.39 | 435.9 | 0.0415 | 0.9865 | 9.1 | 0.997 |
| 5 | 0.41 | 440.4 | 0.0414 | 0.9844 | 9.7 | 0.997 |
| 6 | 0.44 | 444.8 | 0.0413 | 0.9821 | 10.3 | 0.998 |
| 7 | 0.47 | 449.3 | 0.0412 | 0.9795 | 11.0 | 0.998 |
| 8 | 0.50 | 454.5 | 0.0412 | 0.9758 | 11.7 | 0.998 |
| 9 | 0.54 | 460.6 | 0.0410 | 0.9712 | 12.6 | 0.998 |
| 10 | 0.57 | 465.1 | 0.0409 | 0.9675 | 13.4 | 0.998 |
| 11 | 0.62 | 470.0 | 0.0408 | 0.9633 | 14.5 | 0.998 |
| 12 | 0.64 | 474.0 | 0.0407 | 0.9587 | 15.0 | 0.998 |
| 13 | 0.69 | 479.2 | 0.0406 | 0.9533 | 16.1 | 0.999 |
| 14 | 0.75 | 485.5 | 0.0405 | 0.9452 | 17.3 | 0.999 |
| 15 | 0.79 | 489.8 | 0.0404 | 0.9387 | 18.1 | 0.999 |
| 16 | 0.84 | 494.6 | 0.0402 | 0.9319 | 19.2 | 0.999 |
| 17 | 0.90 | 499.6 | 0.0401 | 0.9238 | 20.4 | 1.000 |
| 18 | 0.95 | 504.6 | 0.0400 | 0.9149 | 21.6 | 1.000 |
| 19 | 1.02 | 509.8 | 0.0399 | 0.9047 | 22.7 | 1.000 |
| 20 | 1.08 | 514.9 | 0.0397 | 0.8942 | 24.0 | 1.000 |

**Table A40.**

solute; $CH_3OH$: 0.158 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.35 | 370.9 | 0.0860 | 0.9996 | 4.0 | 0.999 |
| 2 | 0.33 | 368.9 | 0.0861 | 0.9997 | 3.8 | 0.998 |
| 3 | 0.46 | 381.9 | 0.0852 | 0.9994 | 5.4 | 0.999 |
| 4 | 0.54 | 387.3 | 0.0847 | 0.9993 | 6.3 | 0.999 |
| 5 | 0.61 | 392.0 | 0.0842 | 0.9992 | 7.1 | 0.999 |
| 6 | 0.68 | 397.0 | 0.0837 | 0.9990 | 8.1 | 0.999 |
| 7 | 0.75 | 401.2 | 0.0833 | 0.9988 | 8.9 | 0.999 |
| 8 | 0.84 | 406.7 | 0.0827 | 0.9986 | 10.1 | 1.000 |
| 9 | 0.94 | 412.1 | 0.0821 | 0.9983 | 11.3 | 1.000 |
| 10 | 1.04 | 417.2 | 0.0815 | 0.9980 | 12.6 | 1.000 |
| 11 | 1.13 | 422.0 | 0.0809 | 0.9976 | 13.8 | 1.000 |
| 12 | 1.23 | 426.8 | 0.0803 | 0.9972 | 15.1 | 1.001 |
| 13 | 1.35 | 432.1 | 0.0797 | 0.9967 | 16.6 | 1.001 |
| 14 | 1.45 | 437.0 | 0.0791 | 0.9961 | 18.0 | 1.001 |
| 15 | 1.57 | 442.1 | 0.0785 | 0.9955 | 19.6 | 1.001 |
| 16 | 1.68 | 446.4 | 0.0779 | 0.9948 | 21.1 | 1.002 |
| 17 | 1.82 | 452.2 | 0.0772 | 0.9938 | 23.1 | 1.002 |
| 18 | 1.95 | 457.2 | 0.0765 | 0.9928 | 24.9 | 1.002 |
| 19 | 2.07 | 461.9 | 0.0759 | 0.9918 | 26.6 | 1.003 |
| 20 | 2.19 | 466.9 | 0.0753 | 0.9905 | 28.4 | 1.003 |
| 21 | 2.33 | 472.1 | 0.0747 | 0.9890 | 30.3 | 1.003 |
| 22 | 2.44 | 476.3 | 0.0742 | 0.9876 | 31.9 | 1.004 |
| 23 | 2.57 | 481.4 | 0.0737 | 0.9856 | 33.8 | 1.004 |
| 24 | 2.71 | 486.7 | 0.0731 | 0.9833 | 35.8 | 1.004 |
| 25 | 2.86 | 492.2 | 0.0725 | 0.9807 | 37.9 | 1.005 |
| 26 | 2.98 | 496.4 | 0.0721 | 0.9784 | 39.6 | 1.005 |
| 27 | 3.13 | 501.9 | 0.0716 | 0.9751 | 41.8 | 1.005 |
| 28 | 3.26 | 506.4 | 0.0711 | 0.9720 | 43.6 | 1.006 |
| 29 | 3.40 | 511.3 | 0.0707 | 0.9684 | 45.6 | 1.006 |
| 30 | 3.56 | 516.7 | 0.0702 | 0.9638 | 47.8 | 1.007 |

**Table A41.**

solute; $C_2H_5OH$: 0.160 (mol)

solvent; $C_{16}H_{33}OH$: 1.625 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.31 | 381.2 | 0.0875 | 0.9992 | 3.5 | 0.998 |
| 2 | 0.35 | 385.9 | 0.0872 | 0.9990 | 4.0 | 0.998 |
| 3 | 0.41 | 392.1 | 0.0868 | 0.9988 | 4.7 | 0.998 |
| 4 | 0.46 | 396.8 | 0.0864 | 0.9986 | 5.3 | 0.999 |
| 5 | 0.53 | 402.1 | 0.0860 | 0.9983 | 6.1 | 0.999 |
| 6 | 0.58 | 406.6 | 0.0857 | 0.9980 | 6.7 | 0.999 |
| 7 | 0.66 | 411.9 | 0.0852 | 0.9976 | 7.7 | 0.999 |
| 8 | 0.73 | 416.6 | 0.0848 | 0.9973 | 8.5 | 0.999 |
| 9 | 0.81 | 422.2 | 0.0843 | 0.9967 | 9.5 | 1.000 |
| 10 | 0.90 | 427.6 | 0.0838 | 0.9961 | 10.6 | 1.000 |
| 11 | 0.99 | 432.5 | 0.0833 | 0.9955 | 11.7 | 1.000 |
| 12 | 1.07 | 437.1 | 0.0828 | 0.9948 | 12.7 | 1.000 |
| 13 | 1.17 | 442.3 | 0.0823 | 0.9940 | 14.0 | 1.000 |
| 14 | 1.27 | 447.4 | 0.0818 | 0.9930 | 15.2 | 1.001 |
| 15 | 1.37 | 452.2 | 0.0813 | 0.9920 | 16.5 | 1.001 |
| 16 | 1.48 | 457.3 | 0.0807 | 0.9907 | 17.9 | 1.001 |
| 17 | 1.57 | 461.7 | 0.0803 | 0.9895 | 19.1 | 1.002 |
| 18 | 1.67 | 466.4 | 0.0798 | 0.9881 | 20.4 | 1.002 |
| 19 | 1.78 | 471.1 | 0.0793 | 0.9864 | 21.7 | 1.002 |
| 20 | 1.91 | 477.3 | 0.0787 | 0.9839 | 23.5 | 1.002 |
| 21 | 2.03 | 482.1 | 0.0782 | 0.9817 | 25.0 | 1.003 |
| 22 | 2.15 | 487.1 | 0.0777 | 0.9791 | 26.6 | 1.003 |
| 23 | 2.26 | 491.4 | 0.0773 | 0.9767 | 28.0 | 1.004 |
| 24 | 2.39 | 496.6 | 0.0768 | 0.9734 | 29.6 | 1.004 |
| 25 | 2.52 | 501.6 | 0.0763 | 0.9699 | 31.3 | 1.004 |
| 26 | 2.66 | 506.9 | 0.0758 | 0.9658 | 33.1 | 1.005 |
| 27 | 2.79 | 512.0 | 0.0754 | 0.9614 | 34.9 | 1.005 |
| 28 | 2.94 | 516.8 | 0.0749 | 0.9568 | 36.7 | 1.006 |

**Table A42.**

solute; $C_3H_7OH$: 0.098 (mol)

solvent; $C_{16}H_{33}OH$: 1.629 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.32 | 426.6 | 0.0542 | 0.9896 | 5.8 | 0.998 |
| 2 | 0.35 | 431.5 | 0.0540 | 0.9882 | 6.4 | 0.998 |
| 3 | 0.38 | 435.9 | 0.0538 | 0.9865 | 6.9 | 0.998 |
| 4 | 0.42 | 441.2 | 0.0536 | 0.9845 | 7.7 | 0.998 |
| 5 | 0.47 | 447.0 | 0.0533 | 0.9819 | 8.6 | 0.998 |
| 6 | 0.51 | 451.7 | 0.0531 | 0.9796 | 9.4 | 0.999 |
| 7 | 0.55 | 456.3 | 0.0529 | 0.9769 | 10.2 | 0.999 |
| 8 | 0.61 | 462.0 | 0.0526 | 0.9734 | 11.2 | 0.999 |
| 9 | 0.65 | 466.4 | 0.0524 | 0.9703 | 12.0 | 0.999 |
| 10 | 0.71 | 472.0 | 0.0521 | 0.9658 | 13.0 | 0.999 |
| 11 | 0.75 | 475.9 | 0.0519 | 0.9625 | 13.9 | 0.999 |
| 12 | 0.83 | 481.9 | 0.0516 | 0.9569 | 15.2 | 0.999 |
| 13 | 0.89 | 486.9 | 0.0513 | 0.9516 | 16.3 | 1.000 |
| 14 | 0.95 | 491.7 | 0.0510 | 0.9461 | 17.4 | 1.000 |
| 15 | 1.01 | 496.7 | 0.0508 | 0.9396 | 18.6 | 1.000 |
| 16 | 1.09 | 502.0 | 0.0505 | 0.9325 | 19.9 | 1.000 |
| 17 | 1.15 | 506.5 | 0.0503 | 0.9251 | 20.8 | 1.000 |
| 18 | 1.21 | 510.9 | 0.0501 | 0.9176 | 21.9 | 1.001 |
| 19 | 1.31 | 516.8 | 0.0498 | 0.9073 | 23.5 | 1.001 |

**Table A43.**

solute; $C_4H_9OH$: 0.115 (mol)

solvent; $C_{16}H_{33}OH$: 1.637 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.31 | 441.7 | 0.0635 | 0.9789 | 4.8 | 0.998 |
| 2 | 0.35 | 445.9 | 0.0633 | 0.9771 | 5.3 | 0.998 |
| 3 | 0.38 | 451.3 | 0.0631 | 0.9735 | 5.8 | 0.998 |
| 4 | 0.42 | 456.9 | 0.0629 | 0.9696 | 6.5 | 0.998 |
| 5 | 0.47 | 462.0 | 0.0627 | 0.9659 | 7.2 | 0.998 |
| 6 | 0.51 | 467.0 | 0.0625 | 0.9620 | 7.8 | 0.998 |
| 7 | 0.56 | 471.6 | 0.0622 | 0.9580 | 8.5 | 0.998 |
| 8 | 0.61 | 476.9 | 0.0620 | 0.9525 | 9.3 | 0.999 |
| 9 | 0.66 | 481.7 | 0.0618 | 0.9471 | 10.0 | 0.999 |
| 10 | 0.71 | 487.1 | 0.0616 | 0.9406 | 10.8 | 0.999 |
| 11 | 0.77 | 491.8 | 0.0614 | 0.9346 | 11.6 | 0.999 |
| 12 | 0.82 | 496.3 | 0.0611 | 0.9281 | 12.4 | 0.999 |
| 13 | 0.90 | 502.1 | 0.0609 | 0.9193 | 13.4 | 1.000 |
| 14 | 0.96 | 506.9 | 0.0606 | 0.9111 | 14.3 | 1.000 |
| 15 | 1.04 | 511.8 | 0.0604 | 0.9025 | 15.3 | 1.000 |
| 16 | 1.11 | 516.3 | 0.0602 | 0.8940 | 16.2 | 1.000 |

**Table A44.**

solute; $C_5H_{11}OH$: 0.105 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.31 | 450.5 | 0.0587 | 0.9686 | 5.1 | 0.997 |
| 2 | 0.34 | 455.9 | 0.0585 | 0.9641 | 5.6 | 0.998 |
| 3 | 0.38 | 461.3 | 0.0583 | 0.9593 | 6.2 | 0.998 |
| 4 | 0.41 | 465.6 | 0.0581 | 0.9553 | 6.7 | 0.998 |
| 5 | 0.45 | 470.6 | 0.0579 | 0.9502 | 7.4 | 0.998 |
| 6 | 0.50 | 476.3 | 0.0577 | 0.9436 | 8.1 | 0.998 |
| 7 | 0.54 | 480.5 | 0.0576 | 0.9384 | 8.7 | 0.998 |
| 8 | 0.58 | 485.2 | 0.0574 | 0.9321 | 9.4 | 0.998 |
| 9 | 0.64 | 490.7 | 0.0571 | 0.9238 | 10.2 | 0.999 |
| 10 | 0.69 | 495.5 | 0.0569 | 0.9161 | 10.9 | 0.999 |
| 11 | 0.74 | 500.6 | 0.0567 | 0.9072 | 11.7 | 0.999 |
| 12 | 0.80 | 505.4 | 0.0565 | 0.8982 | 12.5 | 0.999 |
| 13 | 0.86 | 510.5 | 0.0563 | 0.8876 | 13.4 | 0.999 |
| 14 | 0.93 | 515.9 | 0.0561 | 0.8755 | 14.3 | 1.000 |

**Table A45.**

solute; $C_6H_{13}OH$: 0.093 (mol)

solvent; $C_{16}H_{33}OH$: 1.621 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.31 | 480.6 | 0.0526 | 0.8945 | 5.3 | 0.997 |
| 2 | 0.34 | 486.1 | 0.0525 | 0.8809 | 5.6 | 0.997 |
| 3 | 0.37 | 490.5 | 0.0524 | 0.8711 | 6.1 | 0.997 |
| 4 | 0.41 | 495.3 | 0.0523 | 0.8609 | 6.6 | 0.998 |
| 5 | 0.44 | 499.5 | 0.0522 | 0.8511 | 7.1 | 0.998 |
| 6 | 0.49 | 506.1 | 0.0520 | 0.8340 | 7.9 | 0.998 |
| 7 | 0.54 | 510.6 | 0.0518 | 0.8228 | 8.5 | 0.998 |
| 8 | 0.59 | 515.6 | 0.0516 | 0.8103 | 9.2 | 0.998 |

**Table A46.**

solute; $H_2O$: 0.109 (mol)

solvent; $C_{16}H_{33}OH$: 1.617 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.34 | 373.0 | 0.0604 | 0.9995 | 5.7 | 0.999 |
| 2 | 0.38 | 377.2 | 0.0601 | 0.9995 | 6.4 | 0.999 |
| 3 | 0.45 | 382.1 | 0.0596 | 0.9994 | 7.5 | 0.999 |
| 4 | 0.51 | 387.1 | 0.0591 | 0.9992 | 8.6 | 0.999 |
| 5 | 0.58 | 392.2 | 0.0586 | 0.9991 | 9.9 | 0.999 |
| 6 | 0.65 | 396.3 | 0.0581 | 0.9990 | 11.1 | 0.999 |
| 7 | 0.74 | 401.6 | 0.0575 | 0.9988 | 12.7 | 1.000 |
| 8 | 0.84 | 407.2 | 0.0569 | 0.9985 | 14.6 | 1.000 |
| 9 | 0.92 | 411.9 | 0.0563 | 0.9983 | 16.2 | 1.000 |
| 10 | 1.00 | 416.5 | 0.0558 | 0.9980 | 17.7 | 1.000 |
| 11 | 1.11 | 421.8 | 0.0551 | 0.9976 | 19.9 | 1.000 |
| 12 | 1.20 | 426.5 | 0.0545 | 0.9972 | 21.9 | 1.000 |
| 13 | 1.31 | 432.0 | 0.0538 | 0.9966 | 24.1 | 1.001 |
| 14 | 1.42 | 437.2 | 0.0532 | 0.9960 | 26.4 | 1.001 |
| 15 | 1.53 | 442.2 | 0.0525 | 0.9953 | 28.8 | 1.001 |
| 16 | 1.64 | 447.0 | 0.0520 | 0.9945 | 31.0 | 1.001 |
| 17 | 1.75 | 451.9 | 0.0513 | 0.9936 | 33.6 | 1.001 |
| 18 | 1.87 | 456.8 | 0.0507 | 0.9926 | 36.2 | 1.002 |
| 19 | 2.00 | 462.4 | 0.0500 | 0.9913 | 39.1 | 1.002 |
| 20 | 2.11 | 467.1 | 0.0495 | 0.9900 | 41.6 | 1.002 |
| 21 | 2.22 | 471.4 | 0.0490 | 0.9886 | 44.2 | 1.002 |
| 22 | 2.33 | 476.4 | 0.0484 | 0.9869 | 46.9 | 1.002 |
| 23 | 2.46 | 481.6 | 0.0479 | 0.9848 | 49.9 | 1.003 |
| 24 | 2.59 | 487.1 | 0.0473 | 0.9823 | 53.1 | 1.003 |
| 25 | 2.70 | 491.6 | 0.0469 | 0.9800 | 55.8 | 1.003 |
| 26 | 2.82 | 496.3 | 0.0464 | 0.9773 | 58.4 | 1.003 |
| 27 | 2.96 | 501.7 | 0.0459 | 0.9738 | 61.8 | 1.004 |
| 28 | 3.09 | 506.8 | 0.0454 | 0.9701 | 65.0 | 1.004 |
| 29 | 3.21 | 511.5 | 0.0450 | 0.9662 | 67.8 | 1.004 |
| 30 | 3.34 | 516.3 | 0.0446 | 0.9619 | 70.8 | 1.005 |

**Table A47.**

solute; CO: 0.745 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 30.74 | 423.9 | 0.0971 | 1.0000 | 308.8 | 1.083 |
| 2 | 31.17 | 428.9 | 0.0927 | 1.0000 | 311.1 | 1.085 |
| 3 | 31.42 | 433.5 | 0.0984 | 1.0000 | 313.2 | 1.087 |
| 4 | 31.97 | 438.9 | 0.0888 | 1.0000 | 314.6 | 1.089 |
| 5 | 32.24 | 444.0 | 0.0947 | 1.0000 | 315.9 | 1.091 |
| 6 | 32.71 | 448.7 | 0.0874 | 1.0000 | 317.1 | 1.093 |
| 7 | 32.82 | 455.2 | 0.1086 | 1.0000 | 318.8 | 1.095 |
| 8 | 33.44 | 460.7 | 0.0956 | 1.0000 | 320.3 | 1.098 |
| 9 | 33.80 | 465.1 | 0.0938 | 1.0000 | 321.4 | 1.100 |
| 10 | 34.15 | 468.7 | 0.0886 | 1.0000 | 322.3 | 1.101 |
| 11 | 34.43 | 473.8 | 0.0935 | 1.0000 | 323.5 | 1.103 |
| 12 | 34.72 | 479.0 | 0.0986 | 1.0000 | 325.3 | 1.106 |
| 13 | 35.15 | 483.7 | 0.0941 | 1.0000 | 326.1 | 1.108 |
| 14 | 35.47 | 490.3 | 0.1027 | 1.0000 | 328.0 | 1.111 |
| 15 | 35.95 | 495.7 | 0.0980 | 1.0000 | 329.2 | 1.114 |
| 16 | 36.30 | 500.1 | 0.0964 | 1.0000 | 330.3 | 1.117 |
| 17 | 36.51 | 505.1 | 0.1045 | 1.0000 | 331.7 | 1.119 |
| 18 | 37.00 | 508.7 | 0.0925 | 1.0000 | 332.6 | 1.121 |
| 19 | 37.10 | 514.7 | 0.1101 | 1.0000 | 334.2 | 1.125 |
| 20 | 37.65 | 520.1 | 0.1021 | 1.0000 | 335.7 | 1.128 |

**Table A48.**

solute; $H_2$: 0.997 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 41.42 | 419.7 | 0.0968 | 1.0000 | 425.9 | 1.102 |
| 2 | 42.53 | 429.6 | 0.0873 | 1.0000 | 439.1 | 1.106 |
| 3 | 42.95 | 434.2 | 0.0883 | 1.0000 | 444.3 | 1.108 |
| 4 | 43.53 | 439.4 | 0.0838 | 1.0000 | 448.1 | 1.111 |
| 5 | 43.97 | 444.4 | 0.0859 | 1.0000 | 454.9 | 1.113 |
| 6 | 44.38 | 449.1 | 0.0893 | 1.0000 | 458.9 | 1.115 |
| 7 | 44.88 | 454.2 | 0.0880 | 1.0000 | 464.7 | 1.118 |
| 8 | 45.29 | 458.4 | 0.0877 | 1.0000 | 470.2 | 1.120 |
| 9 | 45.86 | 464.0 | 0.0862 | 1.0000 | 479.2 | 1.123 |
| 10 | 46.39 | 468.6 | 0.0811 | 1.0000 | 483.3 | 1.126 |
| 11 | 46.77 | 473.5 | 0.0860 | 1.0000 | 490.3 | 1.128 |
| 12 | 47.27 | 478.7 | 0.0864 | 1.0000 | 497.3 | 1.131 |
| 13 | 47.76 | 483.4 | 0.0842 | 1.0000 | 504.2 | 1.134 |
| 14 | 48.23 | 488.1 | 0.0834 | 1.0000 | 507.6 | 1.137 |
| 15 | 48.66 | 492.9 | 0.0851 | 1.0000 | 515.4 | 1.140 |
| 16 | 49.07 | 497.3 | 0.0858 | 1.0000 | 523.1 | 1.143 |
| 17 | 49.62 | 502.6 | 0.0836 | 1.0000 | 528.5 | 1.146 |
| 18 | 50.07 | 507.1 | 0.0829 | 1.0000 | 532.6 | 1.149 |
| 19 | 50.53 | 511.8 | 0.0822 | 1.0000 | 540.1 | 1.152 |
| 20 | 51.03 | 516.8 | 0.0818 | 1.0000 | 546.3 | 1.156 |

**Table A49.**

solute; $CO_2$: 0.522 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 18.67 | 397.9 | 0.1148 | 1.0000 | 140.4 | 1.046 |
| 2 | 18.88 | 405.2 | 0.1246 | 1.0000 | 143.5 | 1.047 |
| 3 | 19.24 | 408.8 | 0.1132 | 1.0000 | 144.6 | 1.048 |
| 4 | 19.43 | 415.9 | 0.1242 | 1.0000 | 147.7 | 1.049 |
| 5 | 19.69 | 420.9 | 0.1234 | 1.0000 | 150.2 | 1.050 |
| 6 | 19.93 | 425.6 | 0.1232 | 1.0000 | 152.0 | 1.051 |
| 7 | 20.12 | 430.0 | 0.1255 | 1.0000 | 154.3 | 1.052 |
| 8 | 20.50 | 435.7 | 0.1200 | 1.0000 | 156.2 | 1.054 |
| 9 | 20.57 | 440.4 | 0.1296 | 1.0000 | 158.6 | 1.055 |
| 10 | 20.99 | 445.0 | 0.1181 | 1.0000 | 160.9 | 1.056 |
| 11 | 21.06 | 450.2 | 0.1293 | 1.0000 | 163.3 | 1.057 |
| 12 | 21.49 | 453.8 | 0.1149 | 1.0000 | 164.6 | 1.059 |
| 13 | 21.86 | 459.4 | 0.1101 | 1.0000 | 167.6 | 1.060 |
| 14 | 21.98 | 465.1 | 0.1197 | 1.0000 | 170.0 | 1.062 |
| 15 | 22.34 | 470.1 | 0.1139 | 1.0000 | 172.5 | 1.063 |
| 16 | 22.54 | 475.5 | 0.1179 | 1.0000 | 175.5 | 1.065 |
| 17 | 22.82 | 480.4 | 0.1158 | 1.0000 | 178.3 | 1.066 |
| 18 | 23.12 | 485.3 | 0.1133 | 1.0000 | 180.2 | 1.068 |
| 19 | 23.37 | 490.3 | 0.1133 | 1.0000 | 183.2 | 1.070 |
| 20 | 23.44 | 494.7 | 0.1211 | 1.0000 | 185.2 | 1.071 |
| 21 | 23.55 | 498.4 | 0.1250 | 1.0000 | 187.5 | 1.072 |
| 22 | 23.82 | 504.2 | 0.1265 | 1.0000 | 190.6 | 1.074 |
| 23 | 24.45 | 509.2 | 0.1068 | 1.0000 | 193.2 | 1.076 |
| 24 | 24.54 | 513.6 | 0.1139 | 1.0000 | 195.9 | 1.078 |
| 25 | 24.95 | 519.4 | 0.1078 | 1.0000 | 199.4 | 1.080 |

**Table A50.**

solute; $C_2H_6$: 0.741 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 24.66 | 424.0 | 0.2881 | 1.0000 | 75.5 | 1.076 |
| 2 | 24.98 | 428.8 | 0.2884 | 1.0000 | 76.2 | 1.078 |
| 3 | 25.30 | 433.9 | 0.2895 | 1.0000 | 76.9 | 1.079 |
| 4 | 25.67 | 440.1 | 0.2915 | 1.0000 | 77.5 | 1.082 |
| 5 | 26.05 | 442.3 | 0.2816 | 1.0000 | 77.9 | 1.083 |
| 6 | 26.30 | 448.7 | 0.2897 | 1.0000 | 78.6 | 1.085 |
| 7 | 26.64 | 455.2 | 0.2938 | 1.0000 | 79.7 | 1.087 |
| 8 | 27.01 | 460.1 | 0.2924 | 1.0000 | 80.3 | 1.089 |
| 9 | 27.41 | 464.6 | 0.2888 | 1.0000 | 81.2 | 1.091 |
| 10 | 27.76 | 468.8 | 0.2863 | 1.0000 | 81.7 | 1.093 |
| 11 | 27.99 | 473.8 | 0.2902 | 1.0000 | 82.3 | 1.095 |
| 12 | 28.26 | 478.7 | 0.2932 | 1.0000 | 83.2 | 1.097 |
| 13 | 28.64 | 483.8 | 0.2919 | 1.0000 | 83.9 | 1.100 |
| 14 | 28.88 | 488.8 | 0.2954 | 1.0000 | 84.5 | 1.102 |
| 15 | 29.27 | 493.7 | 0.2934 | 1.0000 | 85.3 | 1.105 |
| 16 | 29.66 | 498.9 | 0.2924 | 1.0000 | 86.5 | 1.107 |
| 17 | 29.86 | 505.1 | 0.3004 | 1.0000 | 86.8 | 1.110 |
| 18 | 30.24 | 509.2 | 0.2967 | 1.0000 | 87.7 | 1.113 |
| 19 | 30.38 | 513.7 | 0.3028 | 1.0000 | 88.3 | 1.115 |
| 20 | 30.67 | 518.6 | 0.3042 | 1.0000 | 89.1 | 1.118 |

**Table A51.**

solute; $C_3H_8$: 0.156 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 4.46 | 423.8 | 0.1320 | 1.0000 | 32.5 | 1.012 |
| 2 | 4.58 | 429.0 | 0.1288 | 1.0000 | 34.2 | 1.013 |
| 3 | 4.65 | 433.7 | 0.1278 | 1.0000 | 35.0 | 1.013 |
| 4 | 4.72 | 438.9 | 0.1267 | 1.0000 | 35.9 | 1.013 |
| 5 | 4.80 | 443.6 | 0.1256 | 1.0000 | 36.8 | 1.014 |
| 6 | 4.91 | 448.8 | 0.1224 | 1.0000 | 38.6 | 1.014 |
| 7 | 4.95 | 455.2 | 0.1242 | 1.0000 | 38.4 | 1.014 |
| 8 | 5.02 | 459.6 | 0.1234 | 1.0000 | 39.2 | 1.015 |
| 9 | 5.20 | 463.8 | 0.1164 | 1.0000 | 43.0 | 1.015 |
| 10 | 5.26 | 469.1 | 0.1164 | 1.0000 | 43.5 | 1.016 |
| 11 | 5.37 | 474.4 | 0.1139 | 1.0000 | 45.4 | 1.016 |
| 12 | 5.46 | 479.0 | 0.1123 | 1.0000 | 46.7 | 1.017 |
| 13 | 5.53 | 485.3 | 0.1123 | 1.0000 | 47.4 | 1.017 |
| 14 | 5.63 | 488.9 | 0.1095 | 1.0000 | 49.5 | 1.018 |
| 15 | 5.70 | 493.7 | 0.1086 | 1.0000 | 50.5 | 1.018 |
| 16 | 5.81 | 500.1 | 0.1074 | 1.0000 | 52.0 | 1.019 |
| 17 | 5.91 | 505.3 | 0.1056 | 1.0000 | 53.8 | 1.019 |
| 18 | 6.01 | 509.9 | 0.1033 | 1.0000 | 56.0 | 1.020 |
| 19 | 6.10 | 515.0 | 0.1020 | 1.0000 | 57.5 | 1.020 |
| 20 | 6.19 | 518.7 | 0.0996 | 1.0000 | 59.8 | 1.021 |

**Table A52.**

solute; $C_5H_{12}$: 0.056 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.86 | 424.4 | 0.0971 | 1.0000 | 8.8 | 0.999 |
| 2 | 0.91 | 429.0 | 0.0949 | 1.0000 | 9.5 | 1.000 |
| 3 | 0.95 | 433.9 | 0.0930 | 1.0000 | 10.1 | 1.000 |
| 4 | 0.98 | 438.9 | 0.0922 | 1.0000 | 10.5 | 1.000 |
| 5 | 1.05 | 443.8 | 0.0886 | 1.0000 | 11.7 | 1.000 |
| 6 | 1.09 | 449.0 | 0.0869 | 1.0000 | 12.4 | 1.000 |
| 7 | 1.13 | 455.2 | 0.0858 | 1.0000 | 13.0 | 1.001 |
| 8 | 1.19 | 459.8 | 0.0832 | 1.0000 | 14.1 | 1.001 |
| 9 | 1.23 | 463.9 | 0.0814 | 1.0000 | 14.9 | 1.001 |
| 10 | 1.29 | 468.6 | 0.0790 | 1.0000 | 16.0 | 1.001 |
| 11 | 1.33 | 473.8 | 0.0773 | 1.0000 | 16.9 | 1.001 |
| 12 | 1.37 | 479.3 | 0.0759 | 1.0000 | 17.8 | 1.002 |
| 13 | 1.42 | 484.7 | 0.0743 | 1.0000 | 18.8 | 1.002 |
| 14 | 1.45 | 490.2 | 0.0734 | 1.0000 | 19.5 | 1.002 |
| 15 | 1.50 | 493.7 | 0.0714 | 1.0000 | 20.6 | 1.002 |
| 16 | 1.56 | 499.3 | 0.0690 | 1.0000 | 22.3 | 1.003 |
| 17 | 1.60 | 505.4 | 0.0678 | 1.0000 | 23.3 | 1.003 |
| 18 | 1.64 | 509.9 | 0.0666 | 1.0000 | 24.2 | 1.003 |
| 19 | 1.69 | 513.7 | 0.0647 | 1.0000 | 25.7 | 1.003 |
| 20 | 1.73 | 518.7 | 0.0638 | 1.0000 | 26.6 | 1.003 |

**Table A53.**

solute; $C_6H_{14}$: 0.070 (mol)

solvent; $C_{28}H_{58}$: 0.332 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.28 | 372.4 | 0.1590 | 1.0000 | 1.8 | 0.996 |
| 2 | 0.32 | 378.8 | 0.1575 | 1.0000 | 2.0 | 0.997 |
| 3 | 0.34 | 385.9 | 0.1565 | 1.0000 | 2.2 | 0.997 |
| 4 | 0.38 | 387.9 | 0.1544 | 1.0000 | 2.4 | 0.997 |
| 5 | 0.42 | 394.5 | 0.1526 | 1.0000 | 2.7 | 0.997 |
| 6 | 0.45 | 400.9 | 0.1516 | 1.0000 | 2.9 | 0.997 |
| 7 | 0.50 | 403.5 | 0.1490 | 1.0000 | 3.3 | 0.998 |
| 8 | 0.54 | 409.4 | 0.1473 | 1.0000 | 3.6 | 0.998 |
| 9 | 0.57 | 414.4 | 0.1456 | 1.0000 | 3.9 | 0.998 |
| 10 | 0.61 | 419.6 | 0.1438 | 1.0000 | 4.2 | 0.998 |
| 11 | 0.66 | 423.9 | 0.1417 | 1.0000 | 4.6 | 0.998 |
| 12 | 0.71 | 429.0 | 0.1396 | 1.0000 | 5.0 | 0.999 |
| 13 | 0.74 | 433.9 | 0.1382 | 1.0000 | 5.3 | 0.999 |
| 14 | 0.80 | 439.0 | 0.1355 | 1.0000 | 5.8 | 0.999 |
| 15 | 0.84 | 444.1 | 0.1342 | 1.0000 | 6.2 | 0.999 |
| 16 | 0.88 | 448.8 | 0.1327 | 1.0000 | 6.5 | 0.999 |
| 17 | 0.95 | 454.5 | 0.1297 | 1.0000 | 7.2 | 1.000 |
| 18 | 0.99 | 458.6 | 0.1279 | 1.0000 | 7.6 | 1.000 |
| 19 | 1.05 | 463.7 | 0.1257 | 1.0000 | 8.2 | 1.000 |
| 20 | 1.11 | 469.7 | 0.1233 | 1.0000 | 8.8 | 1.001 |
| 21 | 1.15 | 474.8 | 0.1217 | 1.0000 | 9.3 | 1.001 |
| 22 | 1.21 | 479.1 | 0.1196 | 1.0000 | 9.9 | 1.001 |
| 23 | 1.24 | 483.8 | 0.1186 | 1.0000 | 10.2 | 1.001 |
| 24 | 1.29 | 489.6 | 0.1168 | 1.0000 | 10.8 | 1.001 |
| 25 | 1.35 | 493.8 | 0.1145 | 1.0000 | 11.6 | 1.002 |
| 26 | 1.41 | 500.2 | 0.1123 | 1.0000 | 12.3 | 1.002 |
| 27 | 1.46 | 504.0 | 0.1106 | 1.0000 | 12.9 | 1.002 |
| 28 | 1.51 | 508.7 | 0.1087 | 1.0000 | 13.6 | 1.003 |
| 29 | 1.58 | 513.5 | 0.1064 | 1.0000 | 14.5 | 1.003 |
| 30 | 1.62 | 518.6 | 0.1049 | 1.0000 | 15.1 | 1.003 |

**Table A54.**

solute; $CH_3OH$: 0.051 (mol)

solvent; $C_{28}H_{58}$: 0.327 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 1.64 | 424.4 | 0.0375 | 1.0000 | 43.0 | 1.002 |
| 2 | 1.61 | 429.7 | 0.0409 | 1.0000 | 38.8 | 1.002 |
| 3 | 1.61 | 434.2 | 0.0419 | 1.0000 | 37.9 | 1.002 |
| 4 | 1.63 | 438.9 | 0.0421 | 1.0000 | 38.0 | 1.002 |
| 5 | 1.65 | 443.9 | 0.0421 | 1.0000 | 38.5 | 1.002 |
| 6 | 1.67 | 449.0 | 0.0419 | 1.0000 | 39.2 | 1.002 |
| 7 | 1.69 | 454.4 | 0.0416 | 1.0000 | 40.1 | 1.002 |
| 8 | 1.71 | 459.0 | 0.0413 | 1.0000 | 41.0 | 1.002 |
| 9 | 1.75 | 463.6 | 0.0404 | 1.0000 | 42.7 | 1.002 |
| 10 | 1.77 | 469.6 | 0.0401 | 1.0000 | 43.6 | 1.002 |
| 11 | 1.80 | 475.1 | 0.0400 | 1.0000 | 44.2 | 1.002 |
| 12 | 1.82 | 479.4 | 0.0394 | 1.0000 | 45.7 | 1.003 |
| 13 | 1.84 | 484.6 | 0.0398 | 1.0000 | 45.6 | 1.003 |
| 14 | 1.87 | 488.9 | 0.0388 | 1.0000 | 47.6 | 1.003 |
| 15 | 1.89 | 493.6 | 0.0386 | 1.0000 | 48.3 | 1.003 |
| 16 | 1.92 | 498.7 | 0.0381 | 1.0000 | 49.7 | 1.003 |
| 17 | 1.94 | 503.8 | 0.0379 | 1.0000 | 50.6 | 1.003 |
| 18 | 1.97 | 508.7 | 0.0376 | 1.0000 | 51.6 | 1.003 |
| 19 | 2.00 | 513.7 | 0.0369 | 1.0000 | 53.4 | 1.003 |
| 20 | 2.03 | 518.8 | 0.0363 | 1.0000 | 55.1 | 1.003 |

**Table A55.**

solute; $C_2H_5OH$: 0.132 (mol)

solvent; $C_{28}H_{58}$: 0.337 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 2.68 | 424.7 | 0.1683 | 1.0000 | 15.4 | 1.005 |
| 2 | 2.86 | 428.8 | 0.1606 | 1.0000 | 17.1 | 1.006 |
| 3 | 2.94 | 434.0 | 0.1585 | 1.0000 | 17.9 | 1.006 |
| 4 | 3.01 | 438.7 | 0.1565 | 1.0000 | 18.5 | 1.006 |
| 5 | 3.13 | 443.6 | 0.1524 | 1.0000 | 19.8 | 1.007 |
| 6 | 3.21 | 448.6 | 0.1501 | 1.0000 | 20.6 | 1.007 |
| 7 | 3.30 | 453.6 | 0.1478 | 1.0000 | 21.5 | 1.007 |
| 8 | 3.39 | 458.6 | 0.1449 | 1.0000 | 22.5 | 1.008 |
| 9 | 3.46 | 463.4 | 0.1438 | 1.0000 | 23.1 | 1.008 |
| 10 | 3.56 | 469.1 | 0.1407 | 1.0000 | 24.4 | 1.008 |
| 11 | 3.65 | 475.0 | 0.1389 | 1.0000 | 25.3 | 1.009 |
| 12 | 3.74 | 478.8 | 0.1362 | 1.0000 | 26.4 | 1.009 |
| 13 | 3.88 | 485.1 | 0.1315 | 1.0000 | 28.4 | 1.010 |
| 14 | 4.11 | 489.2 | 0.1225 | 1.0000 | 32.2 | 1.011 |
| 15 | 4.29 | 494.7 | 0.1158 | 1.0000 | 35.5 | 1.011 |
| 16 | 4.34 | 498.8 | 0.1153 | 1.0000 | 36.1 | 1.012 |
| 17 | 4.42 | 503.6 | 0.1136 | 1.0000 | 37.4 | 1.012 |
| 18 | 4.51 | 508.6 | 0.1114 | 1.0000 | 38.9 | 1.012 |
| 19 | 4.58 | 513.5 | 0.1103 | 1.0000 | 39.9 | 1.013 |
| 20 | 4.67 | 518.6 | 0.1083 | 1.0000 | 41.5 | 1.013 |

**Table A56.**

solute; $C_3H_7OH$: 0.127 (mol)

solvent; $C_{28}H_{58}$: 0.339 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.73 | 373.6 | 0.2408 | 1.0000 | 3.0 | 0.999 |
| 2 | 0.81 | 379.6 | 0.2375 | 1.0000 | 3.4 | 0.999 |
| 3 | 0.92 | 383.8 | 0.2330 | 1.0000 | 3.9 | 1.000 |
| 4 | 1.01 | 388.9 | 0.2296 | 1.0000 | 4.3 | 1.000 |
| 5 | 1.14 | 394.1 | 0.2244 | 1.0000 | 5.0 | 1.000 |
| 6 | 1.26 | 399.5 | 0.2197 | 1.0000 | 5.6 | 1.001 |
| 7 | 1.34 | 404.0 | 0.2166 | 1.0000 | 6.0 | 1.001 |
| 8 | 1.46 | 409.5 | 0.2119 | 1.0000 | 6.7 | 1.002 |
| 9 | 1.58 | 414.0 | 0.2073 | 1.0000 | 7.4 | 1.002 |
| 10 | 1.68 | 418.7 | 0.2037 | 1.0000 | 8.0 | 1.002 |
| 11 | 1.76 | 423.7 | 0.2007 | 1.0000 | 8.5 | 1.003 |
| 12 | 1.90 | 428.9 | 0.1955 | 1.0000 | 9.4 | 1.003 |
| 13 | 2.01 | 433.7 | 0.1913 | 1.0000 | 10.2 | 1.004 |
| 14 | 2.11 | 439.8 | 0.1881 | 1.0000 | 10.8 | 1.004 |
| 15 | 2.22 | 444.9 | 0.1844 | 1.0000 | 11.6 | 1.004 |
| 16 | 2.32 | 449.5 | 0.1808 | 1.0000 | 12.4 | 1.005 |
| 17 | 2.39 | 453.7 | 0.1788 | 1.0000 | 12.9 | 1.005 |
| 18 | 2.50 | 460.1 | 0.1753 | 1.0000 | 13.7 | 1.005 |
| 19 | 2.61 | 463.8 | 0.1712 | 1.0000 | 14.7 | 1.006 |
| 20 | 2.70 | 468.8 | 0.1689 | 1.0000 | 15.4 | 1.006 |
| 21 | 2.80 | 473.8 | 0.1658 | 1.0000 | 16.2 | 1.007 |
| 22 | 2.89 | 478.8 | 0.1628 | 1.0000 | 17.1 | 1.007 |
| 23 | 2.98 | 483.6 | 0.1604 | 1.0000 | 17.9 | 1.007 |
| 24 | 3.10 | 488.9 | 0.1565 | 1.0000 | 19.0 | 1.008 |
| 25 | 3.17 | 493.7 | 0.1549 | 1.0000 | 19.7 | 1.008 |
| 26 | 3.25 | 499.3 | 0.1532 | 1.0000 | 20.4 | 1.008 |
| 27 | 3.34 | 504.5 | 0.1507 | 1.0000 | 21.3 | 1.009 |
| 28 | 3.48 | 509.8 | 0.1460 | 1.0000 | 22.9 | 1.010 |
| 29 | 3.57 | 514.8 | 0.1441 | 1.0000 | 23.8 | 1.010 |
| 30 | 3.65 | 519.8 | 0.1419 | 1.0000 | 24.7 | 1.010 |

**Table A57.**

solute; $C_4H_9OH$: 0.097 (mol)

solvent; $C_{28}H_{58}$: 0.352 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.83 | 423.6 | 0.1809 | 1.0000 | 4.5 | 0.999 |
| 2 | 0.90 | 428.8 | 0.1781 | 1.0000 | 5.0 | 1.000 |
| 3 | 0.95 | 433.8 | 0.1762 | 1.0000 | 5.3 | 1.000 |
| 4 | 1.04 | 439.7 | 0.1731 | 1.0000 | 5.9 | 1.000 |
| 5 | 1.12 | 443.9 | 0.1700 | 1.0000 | 6.4 | 1.000 |
| 6 | 1.20 | 448.6 | 0.1669 | 1.0000 | 7.0 | 1.001 |
| 7 | 1.25 | 454.8 | 0.1653 | 1.0000 | 7.4 | 1.001 |
| 8 | 1.34 | 460.0 | 0.1621 | 1.0000 | 8.1 | 1.001 |
| 9 | 1.41 | 465.1 | 0.1597 | 1.0000 | 8.6 | 1.002 |
| 10 | 1.49 | 469.6 | 0.1567 | 1.0000 | 9.3 | 1.002 |
| 11 | 1.52 | 473.7 | 0.1561 | 1.0000 | 9.5 | 1.002 |
| 12 | 1.59 | 478.4 | 0.1537 | 1.0000 | 10.1 | 1.002 |
| 13 | 1.70 | 483.7 | 0.1500 | 1.0000 | 11.0 | 1.003 |
| 14 | 1.78 | 488.8 | 0.1475 | 1.0000 | 11.7 | 1.003 |
| 15 | 1.85 | 493.5 | 0.1450 | 1.0000 | 12.4 | 1.003 |
| 16 | 1.89 | 499.4 | 0.1443 | 1.0000 | 12.8 | 1.004 |
| 17 | 1.98 | 504.2 | 0.1413 | 1.0000 | 13.6 | 1.004 |
| 18 | 2.04 | 508.3 | 0.1396 | 1.0000 | 14.2 | 1.004 |
| 19 | 2.13 | 514.5 | 0.1371 | 1.0000 | 15.1 | 1.005 |
| 20 | 2.23 | 519.5 | 0.1339 | 1.0000 | 16.1 | 1.005 |

**Table A58.**

solute; $C_5H_{11}OH$: 0.091 (mol)

solvent; $C_{28}H_{58}$: 0.329 (mol)

| run nr. | P / bar | T / K | $x_1$ / – | $y_1$ / – | $H_{12}^{PS}$ / bar | Pntr / – |
|---|---|---|---|---|---|---|
| 1 | 0.61 | 424.4 | 0.1887 | 1.0000 | 3.2 | 0.998 |
| 2 | 0.66 | 429.6 | 0.1865 | 1.0000 | 3.5 | 0.999 |
| 3 | 0.71 | 434.4 | 0.1844 | 1.0000 | 3.8 | 0.999 |
| 4 | 0.76 | 438.8 | 0.1823 | 1.0000 | 4.1 | 0.999 |
| 5 | 0.82 | 443.8 | 0.1802 | 1.0000 | 4.5 | 0.999 |
| 6 | 0.87 | 449.2 | 0.1784 | 1.0000 | 4.8 | 0.999 |
| 7 | 0.93 | 453.8 | 0.1760 | 1.0000 | 5.2 | 1.000 |
| 8 | 0.98 | 458.8 | 0.1740 | 1.0000 | 5.5 | 1.000 |
| 9 | 1.04 | 463.7 | 0.1719 | 1.0000 | 5.9 | 1.000 |
| 10 | 1.10 | 469.1 | 0.1696 | 1.0000 | 6.3 | 1.000 |
| 11 | 1.16 | 474.0 | 0.1673 | 1.0000 | 6.8 | 1.001 |
| 12 | 1.22 | 479.0 | 0.1654 | 1.0000 | 7.2 | 1.001 |
| 13 | 1.28 | 483.8 | 0.1633 | 1.0000 | 7.6 | 1.001 |
| 14 | 1.34 | 488.7 | 0.1612 | 1.0000 | 8.1 | 1.001 |
| 15 | 1.40 | 493.9 | 0.1592 | 1.0000 | 8.5 | 1.002 |
| 16 | 1.46 | 498.9 | 0.1571 | 1.0000 | 9.0 | 1.002 |
| 17 | 1.52 | 503.9 | 0.1550 | 1.0000 | 9.6 | 1.002 |
| 18 | 1.60 | 509.1 | 0.1525 | 1.0000 | 10.2 | 1.003 |
| 19 | 1.66 | 514.2 | 0.1503 | 1.0000 | 10.7 | 1.003 |
| 20 | 1.72 | 519.2 | 0.1486 | 1.0000 | 11.2 | 1.003 |

**Table A59.**

solute; $C_6H_{13}OH$: 0.074 (mol)

solvent; $C_{28}H_{58}$: 0.362 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 0.17 | 373.5 | 0.1622 | 1.0000 | 1.0 | 0.996 |
| 2 | 0.18 | 384.6 | 0.1616 | 1.0000 | 1.1 | 0.996 |
| 3 | 0.19 | 383.4 | 0.1612 | 1.0000 | 1.2 | 0.996 |
| 4 | 0.20 | 391.3 | 0.1608 | 1.0000 | 1.3 | 0.996 |
| 5 | 0.22 | 392.9 | 0.1602 | 1.0000 | 1.3 | 0.996 |
| 6 | 0.24 | 400.4 | 0.1595 | 1.0000 | 1.5 | 0.996 |
| 7 | 0.25 | 405.3 | 0.1591 | 1.0000 | 1.5 | 0.996 |
| 8 | 0.27 | 408.1 | 0.1580 | 1.0000 | 1.7 | 0.997 |
| 9 | 0.28 | 413.8 | 0.1578 | 1.0000 | 1.8 | 0.997 |
| 10 | 0.30 | 420.2 | 0.1569 | 1.0000 | 1.9 | 0.997 |
| 11 | 0.34 | 423.1 | 0.1555 | 1.0000 | 2.1 | 0.997 |
| 12 | 0.36 | 428.7 | 0.1546 | 1.0000 | 2.3 | 0.997 |
| 13 | 0.37 | 434.1 | 0.1545 | 1.0000 | 2.4 | 0.997 |
| 14 | 0.40 | 440.2 | 0.1535 | 1.0000 | 2.5 | 0.997 |
| 15 | 0.43 | 446.6 | 0.1523 | 1.0000 | 2.8 | 0.997 |
| 16 | 0.46 | 448.5 | 0.1512 | 1.0000 | 3.0 | 0.997 |
| 17 | 0.47 | 452.7 | 0.1509 | 1.0000 | 3.1 | 0.998 |
| 18 | 0.51 | 461.5 | 0.1493 | 1.0000 | 3.4 | 0.998 |
| 19 | 0.56 | 466.9 | 0.1477 | 1.0000 | 3.7 | 0.998 |
| 20 | 0.58 | 470.7 | 0.1471 | 1.0000 | 3.9 | 0.998 |
| 21 | 0.61 | 475.4 | 0.1460 | 1.0000 | 4.1 | 0.998 |
| 22 | 0.66 | 481.1 | 0.1443 | 1.0000 | 4.5 | 0.998 |
| 23 | 0.70 | 485.8 | 0.1430 | 1.0000 | 4.8 | 0.999 |
| 24 | 0.73 | 489.9 | 0.1419 | 1.0000 | 5.1 | 0.999 |
| 25 | 0.78 | 496.4 | 0.1404 | 1.0000 | 5.4 | 0.999 |
| 26 | 0.81 | 500.5 | 0.1393 | 1.0000 | 5.7 | 0.999 |
| 27 | 0.85 | 505.1 | 0.1382 | 1.0000 | 6.0 | 0.999 |
| 28 | 0.88 | 509.1 | 0.1372 | 1.0000 | 6.3 | 0.999 |
| 29 | 0.92 | 513.2 | 0.1359 | 1.0000 | 6.6 | 1.000 |
| 30 | 0.95 | 517.1 | 0.1348 | 1.0000 | 6.9 | 1.000 |

**Table A60.**

solute; $H_2O$: 0.061 (mol)

solvent; $C_{28}H_{58}$: 0.339 (mol)

| run nr. | P / bar | T / K | $x_1$ / - | $y_1$ / - | $H_{12}^{PS}$ / bar | Pntr / - |
|---|---|---|---|---|---|---|
| 1 | 1.52 | 428.8 | 0.0696 | 1.0000 | 21.7 | 1.001 |
| 2 | 1.64 | 434.4 | 0.0638 | 1.0000 | 25.4 | 1.001 |
| 3 | 1.75 | 438.6 | 0.0583 | 1.0000 | 29.7 | 1.002 |
| 4 | 1.80 | 443.8 | 0.0563 | 1.0000 | 31.7 | 1.002 |
| 5 | 1.85 | 449.3 | 0.0546 | 1.0000 | 33.5 | 1.002 |
| 6 | 1.88 | 454.9 | 0.0547 | 1.0000 | 33.9 | 1.002 |
| 7 | 1.95 | 459.4 | 0.0518 | 1.0000 | 37.1 | 1.002 |
| 8 | 1.98 | 463.6 | 0.0507 | 1.0000 | 38.6 | 1.002 |
| 9 | 2.02 | 468.9 | 0.0499 | 1.0000 | 40.0 | 1.002 |
| 10 | 2.06 | 473.8 | 0.0490 | 1.0000 | 41.4 | 1.003 |
| 11 | 2.11 | 478.9 | 0.0473 | 1.0000 | 44.1 | 1.003 |
| 12 | 2.20 | 484.2 | 0.0435 | 1.0000 | 50.0 | 1.003 |
| 13 | 2.26 | 488.6 | 0.0415 | 1.0000 | 53.6 | 1.003 |
| 14 | 2.27 | 494.4 | 0.0422 | 1.0000 | 53.1 | 1.003 |
| 15 | 2.31 | 498.5 | 0.0412 | 1.0000 | 55.3 | 1.003 |
| 16 | 2.37 | 504.5 | 0.0395 | 1.0000 | 59.1 | 1.004 |
| 17 | 2.42 | 508.6 | 0.0377 | 1.0000 | 63.3 | 1.004 |
| 18 | 2.47 | 513.8 | 0.0363 | 1.0000 | 67.1 | 1.004 |
| 19 | 2.53 | 519.0 | 0.0346 | 1.0000 | 72.2 | 1.004 |

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