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Henry's Law constants

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Abstract: Henry's law states that the abundance of a volatile solute dissolved in a liquid is proportional to its abundance in the gas phase. It applies at equilibrium and in the limit of infinite dilution of the solute. For historical reasons, numerous different definitions, names, and symbols are used in the literature to express the proportionality coefficient, denoted the "Henry's law constant". Here, a consistent set of recommendations is presented. An important distinction is made between two new recommended reciprocal quantities "Henry's law solubility constant" (H_s) and "Henry's law volatility constant" (H_v). Eight recommended variants of H_s and H_v are described and relations among them presented.

Keywords: Henry's law; solubility; volatility; gas-solution equilibrium

1 Introduction

In his original publication from 1803, William Henry described his discovery [1]:

> "[. . .] water takes up, of gas condensed by one, two, or more additional atmospheres, a quantity which, ordinarily compressed, would be equal to twice, thrice, &c. the volume absorbed under the common pressure of the atmosphere."

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Today, this proportionality, at equilibrium, between the abundance of a species in the gas phase and its abundance in a liquid solution is known as Henry's law. It is a limiting law, analogous to the ideal gas law, valid only in the limits of infinite dilution of the solute and ideality in the gas phase. Departure from ideality can be accounted for in Henry's law by replacing abundances by activities (see Sect. 4.3).

Since the Henry's law constant is an extrapolation to infinite dilution, it cannot be measured directly in a laboratory. To distinguish these, we suggest the name "experimental Henry's law constant" for values obtained at a non-zero abundance of the solute.

Values of Henry's law constants are known for many chemical species, mainly for aqueous solutions but also for other solvents. Numerous different and sometimes inconsistent definitions, names, and symbols for the Henry's law constant are currently used in the scientific literature as illustrated in the detailed survey in the supplement.

Unfortunately, there is also a large variety of symbols used in IUPAC publications. In 1983, IUPAC recommended the symbol $\alpha^{\infty}_{\mathrm{x,B}}$ [2, p. 571]. In the glossary of atmospheric chemistry terms (IUPAC recommendations 1990) [3], a different definition was used, and the symbol was changed to H. The IUPAC book "Chemicals in the Atmosphere: Solubility, Sources and Reactivity" from 2003 [4] contains several different symbols ($\tilde{H}_x$, $\tilde{K}_{H_x}$, K_{WA}, K_{AW}, k_{H}, and $c_{\mathrm{w}}/c_{\mathrm{g}}$) in different chapters. The symbol K_{H} (with an upper case K) was used in the introduction to the IUPAC-NIST Solubility Data Series [5]. The symbol was changed to k_{H} (with a lower case k) in the IUPAC recommendations from 2008 [6]. At the time of writing, the online version of the Gold Book [7] contains the recommendations from 1983.

The objective of this article is to present a consistent set of recommended quantities and symbols for Henry's law constants based on IUPAC recommendations for expressing abundances in the two phases. Additionally, formulas are provided for converting between the variants of H. A complete treatment of the thermodynamics underlying Henry's law is beyond the scope of this paper that focuses on quantities and symbols for the Henry's law constant.

2 Recommendations

The multiplicity of expressions for the Henry's law constant exists because there are several quantities that are commonly used to express the (intensive) abun-

dance[1] of a chemical species. For a quantity describing the abundance of a species in the gas phase (generalized as Q_g here), partial pressure p and amount concentration c are commonly used. For a quantity describing the abundance of a solute in a liquid (generalized as Q_l here), choices include amount concentration c, molality b, amount fraction x and mass fraction w (Tab. 1).

The Henry's law constant H is a proportionality coefficient describing the distribution between these phases. It can be defined either as the ratio Q_l/Q_g (related to solubility) or its inverse Q_g/Q_l (related to volatility). Both choices are in common use, and the resulting Henry's law constants are reciprocals of each other. There is no inherent advantage or disadvantage in using one or the other, the two expressions exist for purely historical reasons. There are several examples in other areas of science where reciprocal quantities are commonly used, e.g., resistance *vs* conductance, wavelength *vs* wavenumber, or specific volume *vs* mass density. However, it is unique and confusing that the same term "Henry's law constant" is used for both reciprocals in measurements of the distribution of a chemical species between the gas phase and a liquid solution. Thus, a statement such as "... because of its chemical structure, the species has a very high Henry's law constant..." is ambiguous. It could refer either to a very high solubility or to a very low solubility. To distinguish between the two equivalent but different expressions of Henry's law, the following recommendations are made:

- If the Henry's law constant is defined as a quotient with the liquid phase abundance Q_l in the numerator and the gas phase abundance Q_g in the denominator, the term "Henry's law solubility constant" and the symbol H_s are recommended:

  $$H_s = Q_l/Q_g$$

  For conciseness, "Henry solubility" may alternatively be used.
- If the Henry's law constant is defined as a quotient with the gas phase abundance Q_g in the numerator and the liquid phase abundance Q_l in the denominator, the term "Henry's law volatility constant" and the symbol H_v are recommended:

  $$H_v = Q_g/Q_l$$

  For conciseness, "Henry volatility" may alternatively be used.

It would thus be unambiguous to state that "... because of its chemical structure, the species has a very high Henry's law *solubility* constant...".

1 Here, we use "abundance" as an umbrella term for all intensive quantities which describe how much of an entity is contained in a mixture, e.g., concentration, fraction, molality, or partial pressure.

Tab. 1: Quantities commonly used to define Henry's law constants.

Quantity	Symbol	SI Unit*
Gas phase		
Partial pressure	p	Pa
Amount concentration	c	mol m^{-3}
Solution		
Amount concentration	c	mol m^{-3}
Molality	b	mol kg^{-1}
Amount fraction	x	1
Mass fraction	w	1

*A unit of "1" denotes a dimensionless quantity.

The umbrella terms *Henry's law solubility constant* and *Henry's law volatility constant* can refer to different variants of H, depending on the choice to describe the abundance in each of the phases. When necessary to avoid any ambiguity, especially when referring to a numerical value for a Henry's law constant, an additional two-letter superscript should be added to the symbols H_s and H_v to differentiate between the variants. The letters in the superscript refer to the quantities describing the numerator and the denominator of the definition. Using this notation, H_s^{cp}, for example, refers to the Henry's law solubility constant based on c/p, whereas H_v^{pc} refers to the Henry's law volatility constant based on p/c. The superscripts are necessary to distinguish different variants, especially those which share a common unit. For example, $H_\mathrm{v}^{px} = 1$ Pa and $H_\mathrm{v}^{pw} = 1$ Pa represent different values, and simply writing $H_\mathrm{v} = 1$ Pa could refer to either of them. Another case where the superscript is necessary is in expressions that convert one variant into another, e.g.: $H_\mathrm{s}^{cc} = H_\mathrm{s}^{cp} \times RT$, where R is the gas constant and T is temperature.

The most frequently used variants of Henry's law constants are shown in Fig. 1 and listed in the glossary in Sect. 2.1. In most cases, they are equally well suited to describe Henry's law constants. However, for some purposes, individual variants of H have certain advantages or disadvantages:

- When the molar mass of the solute or solvent is not known (e.g., for polymer solutions), it is not possible to quantify the abundance of the dissolved gas in the liquid phase using the amount fraction x. Thus, neither H_s^{xp} nor H_v^{px} can be used.
- For considerations of interfacial mass transport, the dimensionless Henry's law constants H_s^{cc} and H_v^{cc} are most convenient. As these variants are dimensionless it is essential to specify whether the Henry's law constant is the solubility constant or the volatility constant.

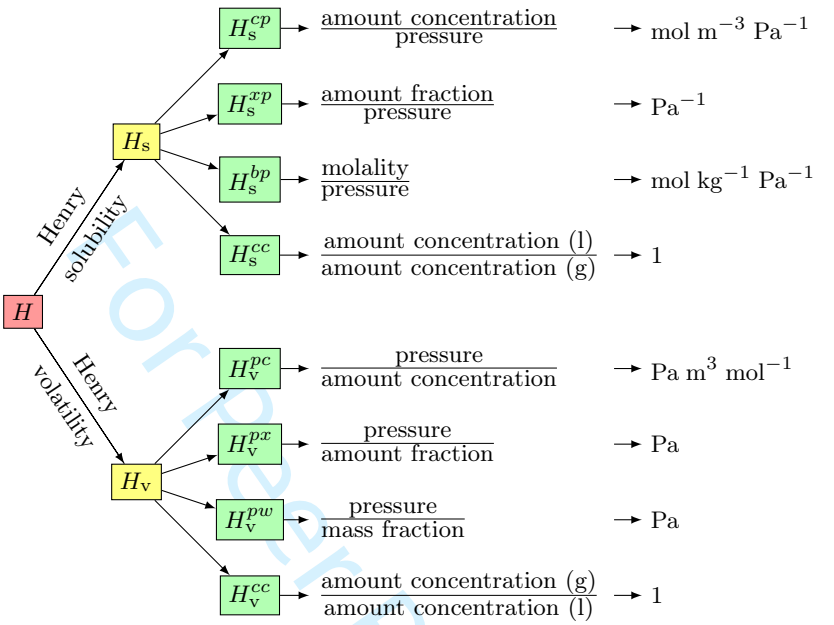

Fig. 1: Classification of Henry's law constants: recommended symbols, definitions and coherent SI units. (l) and (g) refer to the liquid phase and the gas phase, respectively. The symbol H for the umbrella term for all Henry's law constants is shown in red. The two reciprocal types (Henry solubility H_s and Henry volatility H_v) are shown in yellow, distinguished by the subscripts s and v, respectively. The recommended variants of H are shown in green, where the symbols p, c, b, x, and w in the superscript denote pressure, amount concentration, molality, amount fraction, and mass fraction, respectively. The first symbol corresponds to the numerator and the second to the denominator.

- As molality is invariant to temperature and to the addition of dry salt to the solution, using H_s^{bp} can be advantageous, in particular, in expressions involving Sechenov parameters (see Sect. 4.8).
- Because amount fraction and mass fraction are dimensionless, the Henry's law constants H_v^{px} and H_v^{pw} both have the same unit (Pa), and hence dimensional analysis cannot be used to deduce the definition. The dimensionless Henry solubility and the dimensionless Henry volatility similarly suffer from this inherent ambiguity.

It is not possible to use the amount fraction y to describe the gas phase abundance in Henry's law. At a given gas-phase amount fraction, the amount concentration c of the dissolved gas in the liquid depends on the total pressure and thus the ratio

y/c is not a constant. For the same reason, the mass fraction w cannot be used for the gas phase.

To indicate the solute that a Henry's law constant refers to, it should be put in parentheses, e.g.: The Henry's law solubility constant of ozone is $H_s(O_3)$.

The recommendations regarding Henry's law in this publication supersede those in previous IUPAC publications [3, 4, 5, 6, 7, 8, 9].

2.1 Glossary of recommended terms

2.1.1 dimensionless Henry's law solubility constant H_s^{cc} (defined via amount concentrations)

Synonym: dimensionless Henry solubility
Amount concentration of a species in the liquid phase c_l divided by the amount concentration of that species in the gas phase c_g under equilibrium conditions at infinite dilution:

$$H_s^{cc} := \lim_{c_l \to 0} \frac{c_l}{c_g}$$

Note: Instead of the amount concentrations c_l and c_g, the mass concentrations γ_l and γ_g might be used here. This yields the same dimensionless Henry solubility because the molar mass M of the solute cancels out: $\gamma_l/\gamma_g = (c_l M)/(c_g M) = c_l/c_g$.
Example: The dimensionless Henry solubility of ozone in water at $T = 298.15\,K$ is $H_s^{cc}(O_3) = 0.25$.
Related term: Henry's law solubility constant

2.1.2 dimensionless Henry's law volatility constant H_v^{cc} (defined via amount concentrations)

Synonym: dimensionless Henry volatility
Amount concentration of a species in the gas phase c_g divided by the amount concentration of that species in the liquid phase c_l under equilibrium conditions at infinite dilution:

$$H_v^{cc} := \lim_{c_l \to 0} \frac{c_g}{c_l}$$

Note: Instead of the amount concentrations c_g and c_l, the mass concentrations γ_g and γ_l can be used here. This yields the same dimensionless Henry volatility because the molar mass M of the solute cancels out: $\gamma_g/\gamma_l = (c_g M)/(c_l M) = c_g/c_l$.
Example: The dimensionless Henry volatility of ozone in water at $T = 298.15\,K$ is

$H_{\mathrm{v}}^{cc}(\mathrm{O_3}) = 4.0$.
Related term: Henry's law volatility constant

2.1.3 Henry's law

Henry's law states that at equilibrium the abundance of a volatile solute dissolved in a liquid is proportional to its abundance in the gas phase. Henry's law applies in the limit of infinite dilution of the solute. The proportionality factor is called the *Henry's law constant*. The term *Henry's law* is restricted to refer to the distribution between a solution and the gas phase. It should not be used for any other pair of phases. In particular, it should not be used to describe any liquid-liquid [10] or gas-solid (adsorption) equilibria.
Related term: Henry's law constant
Modified from [2].

2.1.4 Henry's law constant, H

Proportionality factor describing the equilibrium distribution of a chemical species between the gas phase and a liquid solution at infinite dilution of the solute according to *Henry's law*. It is an umbrella term for the reciprocal quantities *Henry's law solubility constant* and *Henry's law volatility constant*.

2.1.5 Henry's law solubility constant, H_{s}

Synonym: Henry solubility
Umbrella term for all variants of Henry's law constants that are defined in such a way that the numerical value increases with increasing solubility of the solute. Variants include H_{s}^{cp}, H_{s}^{xp}, H_{s}^{bp}, and H_{s}^{cc} as discussed below.
Related term: Henry's law volatility constant

2.1.6 Henry's law solubility constant (defined via amount concentration and partial pressure), H_{s}^{cp}

Synonym: Henry solubility (defined via amount concentration and partial pressure)
Amount concentration of a species in the liquid phase c_{l} divided by the partial pressure p of that species in the gas phase under equilibrium conditions at infinite

dilution:

$$H_s^{cp} := \lim_{c_l \to 0} \frac{c_l}{p}$$

Note: The coherent SI unit for H_s^{cp} is mol m^{-3} Pa^{-1}. Another commonly used unit is mol $(10^{-3}$ m$^3)^{-1}$ $(10^5$ Pa$)^{-1}$, equivalent to mol L^{-1} bar^{-1}.
Example: The Henry solubility of ozone in water at $T = 298.15$ K is $H_s^{cp}(O_3) = 1.0\times10^{-4}$ mol m^{-3} Pa^{-1}.
Related term: Henry's law solubility constant

2.1.7 Henry's law solubility constant (defined via liquid-phase amount fraction and partial pressure), H_s^{xp}

Synonym: Henry solubility (defined via liquid-phase amount fraction and partial pressure)
Amount fraction of a species in the liquid phase x divided by the partial pressure p of that species in the gas phase under equilibrium conditions at infinite dilution:

$$H_s^{xp} := \lim_{x \to 0} \frac{x}{p}$$

Note: The coherent SI unit for H_s^{xp} is Pa^{-1}.
Example: The Henry solubility (defined via liquid-phase amount fraction and partial pressure) of ozone in water at $T = 298.15$ K is $H_s^{xp}(O_3) = 1.8\times10^{-9}$ Pa^{-1}.
Related term: Henry's law solubility constant

2.1.8 Henry's law solubility constant (defined via molality and partial pressure), H_s^{bp}

Synonym: Henry solubility (defined via molality and partial pressure)
Molality of a species b divided by the partial pressure p of that species in the gas phase under equilibrium conditions at infinite dilution:

$$H_s^{bp} := \lim_{b \to 0} \frac{b}{p}$$

Note 1: The coherent SI unit for H_s^{bp} is mol kg^{-1} Pa^{-1}.
Note 2: Here, the symbol b is used for molality (instead of m) to avoid confusion with the symbol m for mass.
Example: The Henry solubility of ozone in water at $T = 298.15$ K is $H_s^{bp}(O_3) = 1.0\times10^{-7}$ mol kg^{-1} Pa^{-1}.
Related term: Henry's law solubility constant

2.1.9 Henry's law volatility constant, H_{v}

Synonym: Henry volatility
Umbrella term for all variants of Henry's law constants that are defined in such a way that the numerical value increases with increasing volatility of the solute. Variants include H_{v}^{pc}, H_{v}^{px}, H_{v}^{pw}, and H_{v}^{cc} as discussed below.
Related term: Henry's law solubility constant

2.1.10 Henry's law volatility constant (defined via partial pressure and amount concentration), H_{v}^{pc}

Synonym: Henry volatility (defined via partial pressure and amount concentration)
Partial pressure of a species in the gas phase p divided by the amount concentration of that species in the liquid phase c_{l} under equilibrium conditions at infinite dilution:

$$H_{\mathrm{v}}^{pc} := \lim_{c_{\mathrm{l}} \to 0} \frac{p}{c_{\mathrm{l}}}$$

Note: The coherent SI unit for H_{v}^{pc} is $\mathrm{Pa\ m^3\ mol^{-1}}$.
Example: The Henry volatility of ozone in water at $T = 298.15\,\mathrm{K}$ is $H_{\mathrm{v}}^{pc}(\mathrm{O_3}) = 1.0{\times}10^4\,\mathrm{Pa\ m^3\ mol^{-1}}$.
Related term: Henry's law volatility constant

2.1.11 Henry's law volatility constant (defined via partial pressure and liquid-phase amount fraction), H_{v}^{px}

Synonym: Henry volatility (defined via partial pressure and liquid-phase amount fraction)
Partial pressure of a species in the gas phase p divided by the amount fraction of that species in the liquid phase x under equilibrium conditions at infinite dilution:

$$H_{\mathrm{v}}^{px} := \lim_{x \to 0} \frac{p}{x}$$

Note: The coherent SI unit for H_{v}^{px} is Pa.
Example: The Henry volatility (defined via partial pressure and liquid-phase amount fraction) of ozone in water at $T = 298.15\,\mathrm{K}$ is $H_{\mathrm{v}}^{px}(\mathrm{O_3}) = 5.5{\times}10^8\,\mathrm{Pa}$.
Related term: Henry's law volatility constant

2.1.12 Henry's law volatility constant (defined via partial pressure and liquid-phase mass fraction), H_{v}^{pw}

Synonym: Henry volatility (defined via partial pressure and liquid-phase mass fraction)
Partial pressure of a species in the gas phase p divided by the mass fraction of that species in the liquid phase w under equilibrium conditions at infinite dilution:

$$H_{\mathrm{v}}^{pw} := \lim_{w \to 0} \frac{p}{w}$$

Note: The coherent SI unit for H_{v}^{pw} is Pa.
Example: The Henry volatility (defined via partial pressure and liquid-phase mass fraction) of ozone in water at $T = 298.15\,\mathrm{K}$ is $H_{\mathrm{v}}^{pw}(\mathrm{O_3}) = 2.1{\times}10^{8}\,\mathrm{Pa}$.
Related term: Henry's law volatility constant

2.2 Conversion between the variants of Henry's law constants

Factors converting variants of Henry's law constants are shown in Tab. 2. An online converter is available at http://www.henrys-law.org/.

3 Alternative names and symbols (acceptable, obsolete, and deprecated)

A large number of alternative names for the Henry's law constant can be found in the current scientific literature. For consistency and to avoid confusion, they are listed here.

3.1 Glossary of acceptable, obsolete, and deprecated alternative names for Henry's law constants

3.1.1 absorption coefficient

Note: In the older literature, the term absorption coefficient was sometimes used to describe a constant related to Henry's law. This usage is now considered obsolete, see IUPAC glossary of terms related to solubility [6].
Additional note for Gold Book [7] entry [A00037].

Tab. 2: Factors converting variants of Henry's law constants for a solute B in a binary mixture, assuming ideal gas behavior (R = gas constant, T = temperature, $M(\mathrm{B})$ = molar mass of solute, $M(\mathrm{solv})$ = molar mass of solvent, $\varrho(\mathrm{solv})$ = density of solvent).

A) Conversion between variants of Henry's law solubility constants H_s. For example, $H_\mathrm{s}^{cc} = H_\mathrm{s}^{cp} \times RT$.

	$H_\mathrm{s}^{cp} =$	$H_\mathrm{s}^{xp} =$	$H_\mathrm{s}^{bp} =$	$H_\mathrm{s}^{cc} =$
$H_\mathrm{s}^{cp}\times$	1	$\frac{M(\mathrm{solv})}{\varrho(\mathrm{solv})}$	$\frac{1}{\varrho(\mathrm{solv})}$	RT
$H_\mathrm{s}^{xp}\times$	$\frac{\varrho(\mathrm{solv})}{M(\mathrm{solv})}$	1	$\frac{1}{M(\mathrm{solv})}$	$\frac{RT}{M(\mathrm{solv})}\varrho(\mathrm{solv})$
$H_\mathrm{s}^{bp}\times$	$\varrho(\mathrm{solv})$	$M(\mathrm{solv})$	1	$RT\varrho(\mathrm{solv})$
$H_\mathrm{s}^{cc}\times$	$\frac{1}{RT}$	$\frac{M(\mathrm{solv})}{RT\varrho(\mathrm{solv})}$	$\frac{1}{RT\varrho(\mathrm{solv})}$	1

B) Conversion between variants of Henry's law volatility constants H_v. For example, $H_\mathrm{v}^{pc} = H_\mathrm{v}^{cc} \times RT$.

	$H_\mathrm{v}^{pc} =$	$H_\mathrm{v}^{px} =$	$H_\mathrm{v}^{pw} =$	$H_\mathrm{v}^{cc} =$
$H_\mathrm{v}^{pc}\times$	1	$\frac{\varrho(\mathrm{solv})}{M(\mathrm{solv})}$	$\frac{\varrho(\mathrm{solv})}{M(\mathrm{B})}$	$\frac{1}{RT}$
$H_\mathrm{v}^{px}\times$	$\frac{M(\mathrm{solv})}{\varrho(\mathrm{solv})}$	1	$\frac{M(\mathrm{solv})}{M(\mathrm{B})}$	$\frac{M(\mathrm{solv})}{RT\varrho(\mathrm{solv})}$
$H_\mathrm{v}^{pw}\times$	$\frac{M(\mathrm{B})}{\varrho(\mathrm{solv})}$	$\frac{M(\mathrm{B})}{M(\mathrm{solv})}$	1	$\frac{M(\mathrm{B})}{RT\varrho(\mathrm{solv})}$
$H_\mathrm{v}^{cc}\times$	RT	$\frac{RT}{M(\mathrm{solv})}\varrho(\mathrm{solv})$	$\frac{RT}{M(\mathrm{B})}\varrho(\mathrm{solv})$	1

C) Products of Henry's law solubility constants H_s and Henry's law volatility constants H_v. For example, $H_\mathrm{v}^{pc} \times H_\mathrm{s}^{cc} = RT$.

	H_s^{cp}	H_s^{xp}	H_s^{bp}	H_s^{cc}
H_v^{pc}	1	$\frac{M(\mathrm{solv})}{\varrho(\mathrm{solv})}$	$\frac{1}{\varrho(\mathrm{solv})}$	RT
H_v^{px}	$\frac{\varrho(\mathrm{solv})}{M(\mathrm{solv})}$	1	$\frac{1}{M(\mathrm{solv})}$	$\frac{RT}{M(\mathrm{solv})}\varrho(\mathrm{solv})$
H_v^{pw}	$\frac{\varrho(\mathrm{solv})}{M(\mathrm{B})}$	$\frac{M(\mathrm{solv})}{M(\mathrm{B})}$	$\frac{1}{M(\mathrm{B})}$	$\frac{RT}{M(\mathrm{B})}\varrho(\mathrm{solv})$
H_v^{cc}	$\frac{1}{RT}$	$\frac{M(\mathrm{solv})}{RT\varrho(\mathrm{solv})}$	$\frac{1}{RT\varrho(\mathrm{solv})}$	1

3.1.2 air-water partition coefficient

Deprecated: The term *dimensionless Henry volatility* and the symbol H_{v}^{cc} should be used instead.

3.1.3 Bunsen coefficient

Obsolete: In the older literature, the Bunsen coefficient was used to describe a constant related to Henry's law, see IUPAC glossary of terms related to solubility [6].

3.1.4 concentrational solubility coefficient

Deprecated: This term was proposed by the IUPAC clinical chemistry division [2]. It is recommended that the term *Henry's law solubility constant (defined via amount concentration and partial pressure)* and the symbol H_{s}^{cp} should be used instead.

3.1.5 distribution coefficient

Note: The term distribution coefficient refers to liquid-liquid equilibria [10]. Using it to describe gas-liquid equilibria and Henry's law is deprecated.
Additional note for Gold Book [7] entry [D01812]

3.1.6 distribution constant

Note: The term distribution constant refers to liquid-liquid equilibria [10]. Using it to describe gas-liquid equilibria and Henry's law is deprecated.
Additional note for Gold Book [7] entry [D01813]

3.1.7 distribution ratio

Note: The term distribution ratio refers to liquid-liquid distribution [10]. Using it to describe gas-liquid equilibria and Henry's law is deprecated.
Additional note for Gold Book [7] entry [D01817]

3.1.8 Henry fugacity

Deprecated: The term *Henry volatility* and the symbol H_v should be used instead.

3.1.9 Henry coefficient

Acceptable but the term *Henry's law constant* is preferred.

3.1.10 Henry constant

Acceptable but the term *Henry's law constant* is preferred.

3.1.11 Henry's coefficient

Acceptable but the term *Henry's law constant* is preferred.

3.1.12 Henry's constant

Acceptable but the term *Henry's law constant* is preferred.

3.1.13 Henry's law coefficient

Acceptable but the term *Henry's law constant* is preferred.

3.1.14 Kuenen coefficient

Obsolete: In the older literature, the Kuenen coefficient was used to describe a constant related to Henry's law, see IUPAC glossary of terms related to solubility [6].

3.1.15 molal solubility coefficient

Deprecated: This term was proposed by the IUPAC clinical chemistry division [2]. It is recommended that the term *Henry's law solubility constant (defined via molality and partial pressure)* and the symbol H_s^{bp} should be used instead.

3.1.16 Ostwald coefficient

Deprecated: The Ostwald coefficient was used in the older literature for several, slightly different quantities [11]. Occasionally it is used as a synonym for the *dimensionless Henry's law solubility constant* H_s^{cc}. For details, see IUPAC glossary of terms related to solubility [6].

3.1.17 partition coefficient

Note: The term partition coefficient refers to liquid-liquid distribution [10]. Using it to describe gas-liquid equilibria and Henry's law is deprecated.
Additional note for Gold Book [7] entry [P04437]

3.1.18 partition constant

Note: The term partition constant refers to liquid-liquid distribution [10]. Using it to describe gas-liquid equilibria and Henry's law is deprecated.
Additional note for Gold Book [7] entry [P04438]

3.1.19 rational solubility coefficient

Deprecated: This term was proposed by the IUPAC clinical chemistry division [2] and adopted by the Gold Book [7] [H02783]. It is recommended that the term *Henry's law solubility constant (defined via liquid-phase amount fraction and partial pressure)* and the symbol H_s^{xp} should be used instead.

3.1.20 solubility coefficient

Deprecated: The term solubility coefficient should not be used to refer to Henry's law constants. It could be confused with the very different quantities *solubility* [7] [S05740] and *solubility product* [7] [S05742].

3.1.21 solubility constant

The term solubility constant is a generalization [6] which should not be used to refer to Henry's law constants specifically. It could be confused with the very different quantities *solubility* [7] [S05740] and *solubility product* [7] [S05742].

3.1.22 water-air partition coefficient

Deprecated: The term *dimensionless Henry solubility* and the symbol H_s^{cc} should be used instead.

3.2 Deprecated alternative symbols for Henry's law constants

Given the consistent set of symbols as shown in Fig. 1, the usage of other symbols should be avoided. Thus, several symbols which occur frequently in the current scientific literature are now deprecated:

- The symbol K_H is deprecated, the symbol H should be used instead.
- The symbol k_H (with a lower case letter k) it is deprecated as it is internally inconsistent with other IUPAC recommendations. Normally, the lower case letter k describes rate constants, whereas the upper case letter K describes equilibrium constants [8]. Since Henry's law constants are equilibrium constants, the lower case letter k is deprecated.
- The symbol K_{AW} is deprecated; the symbol H_v^{cc} should be used instead.
- The symbol K_{WA} is deprecated; the symbol H_s^{cc} should be used instead.
- The symbol $\alpha_{x,B}^{\infty}$ is deprecated; the symbol H_s^{xp} should be used instead.
- The acronym "HLC" can be used in a sentence. However, it is not a symbol that can be included in an equation.

4 Related topics

4.1 The solvent

Henry's law has been used mainly for water (or aqueous salt solutions) as solvent. However, there is no need to restrict it to aqueous solutions. The term "Henry's law constant" can also be used for equilibria between the gas phase and a non-aqueous solution. The solvent should always be specified.

The term "Henry's law constant" should not be used to describe equilibria between other phase combinations (e.g., liquid-liquid or gas-solid).

4.2 Temperature dependence

The Henry's law constant is a special case of an equilibrium constant, describing an equilibrium between two phases. To describe the temperature dependence of H_s, the van 't Hoff equation can be used:

$$\frac{1}{H_s} \times \frac{dH_s}{d(1/T)} = \frac{-\Delta_{sol}H}{R}$$

where $\Delta_{sol}H$ is the enthalpy of solvation, R is the gas constant and T is the thermodynamic temperature. For a small temperature range, $\Delta_{sol}H$ can be considered constant. If justified by the accuracy of the measurements, miscellaneous parameterizations can be used to express H_s as a function of T for larger temperature ranges [12].

If the conversion factor between two variants of H includes temperature then these variants have different temperature dependences. For example:

$$\begin{aligned} H_s^{cp} &= H_s^{cc}/(RT) \\ \Rightarrow \frac{1}{H_s^{cp}} \frac{dH_s^{cp}}{d(1/T)} &= \frac{1}{H_s^{cc}} \frac{dH_s^{cc}}{d(1/T)} + T \end{aligned}$$

Consequently, the value of $\Delta_{sol}H$ also depends on the chosen variant of H:

$$\Delta_{sol}H(\text{for } H_s^{cp}) = \Delta_{sol}H(\text{for } H_s^{cc}) - RT$$

An additional but minor effect results from the temperature dependence of the density of the solution. This affects Henry's law constants based on concentration c but not those based on molality b, amount fraction x or mass fraction w.

Whenever relating a thermodynamic quantity to a Henry's law constant, it is necessary to specify which variant of Henry's law constant it refers to and which standard states it is based upon.

4.3 Activity coefficients and experimental Henry's law constants

When defining Henry's law constants for a two-component (solvent + solute) system, there is no need to consider any non-ideality because Henry's law constants refer to infinite dilution where activity and fugacity coefficients approach unity. Non-ideal behaviour can be accounted for by using activity coefficients for the solution and fugacity coefficients for the gas phase [13].

Infinite dilution is of course a hypothetical state, and measurements can be performed only at non-zero abundances. An "experimental Henry's law constant" can be defined as, e.g.:

$$H^{cp}_{\mathrm{s,exp}} = \frac{c_{\mathrm{l}}}{p}$$

where c_{l} and p are the measured liquid-phase concentration and partial pressure of the solute, respectively. Due to non-ideality, the experimental Henry's law constant is not a true constant but depends on the solute concentration. From measurements at different abundances, the Henry's law constant can be determined by extrapolation to infinite dilution. For example, for H^{cp}_{s}:

$$H^{cp}_{\mathrm{s}} = \lim_{c_{\mathrm{l}} \to 0} H^{cp}_{\mathrm{s,exp}} = \lim_{c_{\mathrm{l}} \to 0} \frac{c_{\mathrm{l}}}{p}$$

4.4 Effective Henry's law constant

If a Henry's law constant refers to exactly the same species in the gas phase and in the solution, it is called the "intrinsic" Henry's law constant (sometimes, the terms "physical" or "species" Henry's law constant are used). If a Henry's law constant refers to the sum of several species in solution which result via fast equilibrium, it is called the "effective" Henry's law constant (sometimes, the terms "apparent" or "stoichiometric" Henry's law constant are used). An effective Henry's law constant should not be used when the equilibration of the dissolved species is slow relative to other processes being considered, for example, diffusion or chemical reaction in solution. When refering to an effective Henry's law constant, "eff" should be added to the subscript of the symbol.

Taking methanal (formaldehyde, HCHO) as an example, the intrinsic Henry's law constant can be written as:

$$H^{cp}_{\mathrm{s}} = \lim_{c \to 0} \frac{c(\mathrm{HCHO})}{p(\mathrm{HCHO})}$$

In aqueous solutions, HCHO is in equilibrium with its hydrated form:

$$\mathrm{HCHO} + \mathrm{H_2O} \rightleftharpoons \mathrm{H_2C(OH)_2}$$

Here, HCHO denotes the unhydrated, physically dissolved species. The total of the unhydrated and the hydrated form is:

$$\mathrm{HCHO_{tot}}=\mathrm{HCHO} + \mathrm{H_2C(OH)_2}$$

Thus, the effective Henry's law constant of HCHO is:

$$H^{cp}_{\mathrm{s,eff}} = \lim_{c\to 0} \frac{c(\mathrm{HCHO_{tot}})}{p(\mathrm{HCHO})} = \lim_{c\to 0} \frac{c(\mathrm{HCHO}) + c(\mathrm{H_2C(OH)_2})}{p(\mathrm{HCHO})}$$

The relation between the intrinsic and the effective Henry's law constant for HCHO is:

$$H^{cp}_{\mathrm{s,eff}} = H^{cp}_{\mathrm{s}} \times (1 + K_{\mathrm{hyd}})$$

where $K_{\mathrm{hyd}} = \lim_{c\to 0} c(\mathrm{H_2C(OH)_2})/c(\mathrm{HCHO})$ is the hydration equilibrium constant at infinite dilution. Both the intrinsic and the effective Henry's law constant describe a linear proportionality between the phases.

Effective Henry's law constants are also used for chemicals that undergo ionic dissociation upon dissolution. For acids and bases, it can be desired to determine the total of the dissolved species (undissociated dissolved gas plus ionic dissociation species). For example, the effective Henry's law constant of hypochlorous acid (HOCl) is:

$$H^{cp}_{\mathrm{s,eff}} = \lim_{c\to 0} \frac{c(\mathrm{HOCl}) + c(\mathrm{ClO^-})}{p(\mathrm{HOCl})}$$

Considering the acidity constant at infinite dilution

$$K_{\mathrm{a}} = \lim_{c\to 0} c(\mathrm{H^+}) \times c(\mathrm{ClO^-})/c(\mathrm{HOCl})$$

the relation between the intrinsic and the effective Henry's law constant for HOCl can be calculated as:

$$H^{cp}_{\mathrm{s,eff}} = H^{cp}_{\mathrm{s}} \times \left(1 + \frac{K_{\mathrm{a}}}{c(\mathrm{H^+})}\right)$$

Since the factor on the right hand side contains $c(\mathrm{H^+})$, the conversion between the intrinsic and the effective Henry's law constant is pH-dependent. Proportionality between p(HOCl) and the total dissolved hypochlorous acid ($c(\mathrm{HOCl})+c(\mathrm{ClO^-})$) is restricted to conditions under which the uptake of gaseous HOCl does not affect the acidity of the solution. Effective Henry's law constants of acids and bases are not material constants but depend on the solution pH.

4.5 Product of the Henry's law constant and the acidity constant

Sometimes, especially for strong acids, the product of the Henry's law constant (H_s^{cp}) and the acidity constant at infinite dilution (K_a) is presented, e.g.:

$$H_s^{cp} \times K_a = \lim_{c \to 0} \frac{c(\mathrm{HCl})}{p(\mathrm{HCl})} \times \frac{c(\mathrm{H^+}) \times c(\mathrm{Cl^-})}{c(\mathrm{HCl})} = \lim_{c \to 0} \frac{c(\mathrm{H^+}) \times c(\mathrm{Cl^-})}{p(\mathrm{HCl})}$$

With the (difficult to measure) concentration of undissociated HCl canceling out, the overall equilibrium constant $H_s^{cp}K_a$ can be determined more accurately than the individual factors H_s^{cp} and K_a [14]. In addition, it is this overall equilibrium constant that is normally the quantity of interest.

The product $H_s^{cp}K_a$ is sometimes also called a "Henry's law constant". However, as there is no proportionality between $c(\mathrm{Cl^-})$ and $p(\mathrm{HCl})$, the product should not be called a "Henry's law constant" [15].

4.6 Infinite dilution activity coefficient

Dividing the Henry's law volatility constant H_v^{px} by the saturation vapour pressure p^* of the solute yields the infinite dilution activity coefficient γ^∞ (also called limiting activity coefficient):

$$\gamma^\infty = \frac{H_v^{px}}{p^*}$$

It can only be defined below the critical temperature of the solute. Note that γ^∞ is referenced to Raoult's law, not Henry's law[2].

2 In representing the thermodynamics of solutions, two conventions, one symmetric and the other unsymmetric, are used. In the symmetric convention all components are treated similarly, the reference states for the components are the pure substances at the relevant temperature and pressure and, in an ideal solution, all components obey Raoult's law ($p = xp^*$, where x is the amount fraction of the solute in the solution, p its partial pressure in the gas phase, and p^* is the saturated vapor pressure of the pure component). In the unsymmetric or dilute solution convention, the solvent is treated in the same way but the reference states for the solutes are hypothetical solutions having unit concentration but the energetic properties of an infinitely dilute solution. In the ideal dilute solution the solvent obeys Raoult's law but the solutes obey Henry's law. In both conventions non-ideality is accounted for by the inclusion of activity coefficients, which reflect deviations from the relevant ideality. Thus, for some solute amount fraction x one can write: $p = x\gamma_x H_v^{px} = xfp^*$ where the activity coefficients γ_x and f are referenced to Henry's law and Raoult's law, respectively. So $f = \gamma_x H_v^{px}/p^*$ and in the case of the infinitely dilute solution, where $\gamma_x = 1$ and $f = \gamma^\infty$, we obtain $\gamma^\infty = H_v^{px}/p^*$ giving $f = \gamma_x\gamma^\infty$ for any solute concentration, x.

4.7 Value at a reference temperature

Like other thermodynamic quantities, Henry's law constants are often measured and presented at a temperature of $T = 298.15\,\mathrm{K}$. IUPAC has recommended this value as the reference temperature for thermodynamic data [16]. However, since other temperatures (e.g., 273.15 K or 293.15 K) are also occasionally used, it is always necessary to state the chosen value [13]. To indicate the temperature, it can be added to the symbol in parentheses, e.g.: $H_\mathrm{s}(298.15\,\mathrm{K})$.

4.8 Sechenov equation

Values of Henry's law constants depend on the composition of the solution, e.g., on the ionic strength of a salt solution. In general, the solubility of a gas decreases with increasing salinity ("salting out"). This effect is described by the Sechenov equation [17]. There are many ways to define the Sechenov equation, depending on how the composition of the liquid phase is described (based on concentration, molality, or amount fraction) and which variant of the Henry's law constant is used. One possibility is:

$$\log_{10}\left(\frac{H_{\mathrm{s}0}^{bp}}{H_\mathrm{s}^{bp}}\right) = K_\mathrm{s} \times b(\mathrm{salt})$$

where $H_{\mathrm{s}0}^{bp}$ = Henry's law constant for pure water, H_s^{bp} = Henry's law constant for the salt solution, K_s = molality-based Sechenov parameter, and b(salt) = molality of the salt solution.

4.9 Obtaining Henry's law constants

Critical reviews of many Henry's law constants have been published in the IUPAC Solubility Data Series [5]. Another source is the compilation of Henry's law constants [12], which is also available on the internet as a searchable database (http://www.henrys-law.org/).

4.10 Glossary of related topics

4.10.1 effective Henry's law constant, H_eff

Synonyms: apparent Henry's law constant, stoichiometric Henry's law constant
If a Henry's law constant refers to the sum of several species in solution which

result via fast equilibrium, it is called *effective Henry's law constant*.
Example 1: The effective Henry's law constant of HCHO not only considers dissolved HCHO but also the hydrated form $H_2C(OH)_2$.
Example 2: The effective Henry's law constant of HOCl not only considers dissolved HOCl but also its conjugate base ClO^-.
Related term: intrinsic Henry's law constant

4.10.2 intrinsic Henry's law constant

Synonyms: physical Henry's law constant, species Henry's law constant
To emphasize that a Henry's law constant refers to exactly the same species in the gas phase and in solution, and to distinguish it from the *effective Henry's law constant*, it can be called *intrinsic Henry's law constant*.
Related term: effective Henry's law constant

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Henry's law constants (IUPAC Recommendations 2020)

Supplement

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https://iupac.org/project/2019-025-1-100

Miscellaneous definitions, symbols, names and units are used for Henry's law constants in the literature. A survey is shown in the Table of this supplement. It contains about 700 publications taken from the compilation of Sander [1] plus a couple of papers about non-aqueous solutions. The list makes no claims to completeness. Its aim is to provide an overview what terminology is used in the literature. For simplicity, upright and italics fonts are not differentiated. If the symbol contains a subscript referring to a species (e.g., H_{O3}, H_x, H_1, H_i), these are not included. If the papers use several names or symbols, it may be that not all are shown in this survey.

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Symbols, names, and units used for Henry's law constants in the literature.

Symbol	Name	Unit	Comment	Reference
Henry's law solubility constants H_s (used in 266 publications)				
concentration/pressure H_s^{cp} (used in 157 publications)				
		M/atm		Swain and Thornton [2]
		M/atm		Bagno et al. [3]
		M/atm		Dong and Dasgupta [4]
		M/mmHg		Marti et al. [5]
		M/mmHg		Westheimer and Ingraham [6]
		M/mmHg		Guthrie [7]
		M/Pa		Li et al. [8]
	distribution coefficient	M/atm		Lovelock et al. [9]
	gas solubility	M/atm		Mozurkewich [10]
	Henry coefficient	M/atm		Mentel et al. [11]
	Henry's law coefficient	M/atm		Petersen et al. [12]
	Henry's law constant	M/atm		Lee and Zhou [13]
	Henry's law constant	M/atm		Jaeglé et al. [14]
	Henry's law constant	M/atm		Kroll et al. [15]
	Henry's law constant	M/atm		Roberts et al. [16]
	Henry's law constant	M/atm		Holdren et al. [17]
	Henry's law constant	M/atm		Fried et al. [18]
	Henry's law constant	M/atm		Aprea et al. [19]
	Henry's law solubility	M/atm		Disselkamp et al. [20]
A	solubility	M/atm		Manogue and Pigford [21]
c/p	activity coefficient	M/mmHg		Hine and Weimar [22]
E	Henry's law constant	M/atm		Lelieveld and Crutzen [23]
H		M/atm		Schwartz and White [24]
H	Henry's law coefficient	M/atm		Iraci et al. [25]
H	Henry's law coefficient	M/atm		Treves et al. [26]
H	Henry's law coefficient	M/atm		Heal et al. [27]
H	Henry's law coefficient	M/atm		Cheung et al. [28]
H	Henry's law coefficient	M/atm		Harrison et al. [29]
H	Henry's law coefficient	M/atm		Müller and Heal [30]
H	Henry's law coefficient	M/atm		Barcellos da Rosa et al. [31]
H	Henry's law coefficient	M/atm		Hanson and Ravishankara [32]
H	Henry's law coefficient	M/atm		Weinstein-Lloyd and Schwartz [33]
H	Henry's law coefficient	M/atm		Schwartz [34]
H	Henry's law coefficient	M/atm		Hanson et al. [35]
H	Henry's law coefficient	M/atm		Servant et al. [36]
H	Henry's law coefficient	M/atm		Seinfeld [37]
H	Henry's law coefficient	M/atm		Kames and Schurath [38]
H	Henry's law coefficient	M/atm		Rudich et al. [39]
H	Henry's law coefficient	M/atm		Park and Lee [40]
H	Henry's law coefficient	M/atm		Lee and Schwartz [41]
H	Henry's law coefficient	M/atm		Villalta et al. [42]
H	Henry's law coefficient	M/atm		Pandis and Seinfeld [43]
H	Henry's law coefficient	M/atm		Schwartz [44]
H	Henry's law coefficient	M/atm	also: Henry's law solubility	De Bruyn et al. [45]
H	Henry's law constant	M/atm		Bartlett and Margerum [46]

Symbol	Name	Unit	Comment	Reference
H	Henry's law constant	M/atm		Scheer et al. [47]
H	Henry's law constant	M/atm		George et al. [48]
H	Henry's law constant	M/atm		George et al. [49]
H	Henry's law constant	M/atm		Lin and Pehkonen [50]
H	Henry's law constant	M/atm		Katrib et al. [51]
H	Henry's law constant	M/atm		Leriche et al. [52]
H	Henry's law constant	M/atm		Mozurkewich [53]
H	Henry's law constant	M/atm		Pollien et al. [54]
H	Henry's law constant	M/atm		Miller and Stuart [55]
H	Henry's law constant	M/atm		Katrib et al. [56]
H	Henry's law constant	M/atm		Sander et al. [57]
H	Henry's law constant	M/atm		Feigenbrugel et al. [58]
H	Henry's law constant	M/atm		Gershenzon et al. [59]
H	Henry's law constant	M/atm		Sander et al. [60]
H	Henry's law constant	M/atm		Kutsuna et al. [61]
H	Henry's law constant	M/atm		Kutsuna et al. [62]
H	Henry's law constant	M/atm		Roberts et al. [63]
H	Henry's law constant	M/atm		Chen et al. [64]
H	Henry's law constant	M/atm		Reyes-Pérez et al. [65]
H	Henry's law constant	M/atm		Allou et al. [66]
H	Henry's law constant	M/atm		Poulain et al. [67]
H	Henry's law constant	M/atm		Shi et al. [68]
H	Henry's law constant	M/atm		Chan et al. [69]
H	Henry's law constant	M/atm		De Bruyn et al. [70]
H	Henry's law constant	M/atm		Vogt et al. [71]
H	Henry's law constant	M/atm		Betterton and Hoffmann [72]
H	Henry's law constant	M/atm		Kanakidou et al. [73]
H	Henry's law constant	M/atm		Kames et al. [74]
H	Henry's law constant	M/atm		Luke et al. [75]
H	Henry's law constant	M/atm		Behnke et al. [76]
H	Henry's law constant	M/atm		Shepson et al. [77]
H	Henry's law constant	M/atm		Kames and Schurath [78]
H	Henry's law constant	M/atm		Amels et al. [79]
H	Henry's law constant	M/atm		Mirabel et al. [80]
H	Henry's law constant	M/atm		Gaffney et al. [81]
H	Henry's law constant	M/atm		Brian et al. [82]
H	Henry's law constant	M/atm		Lindinger et al. [83]
H	Henry's law constant	M/atm		Régimbal and Mozurkewich [84]
H	Henry's law constant	M/atm		Zhou and Lee [85]
H	Henry's law constant	M/atm		Graedel and Goldberg [86]
H	Henry's law constant	M/atm		Frenzel et al. [87]
H	Henry's law constant	M/atm		Schwarzenbach et al. [88]
H	Henry's law constant	M/atm		Seyfioglu and Odabasi [89]
H	Henry's law constant	M/atm		Betterton [90]
H	Henry's law constant	M/atm	also: Henry's law solubility	Lee and Zhou [91]
H	solubility coefficient	M/atm		Kramers et al. [92]
H, K_H, H'	Henry's law coefficient	M/atm		Benkelberg et al. [93]
H, K_{PC}	Henry's law constant	M/atm		Karl et al. [94]
H^*	effective Henry's law constant	M/atm		McNeill et al. [95]
H_x	Henry's law constant	M/atm		Strekowski and George [96]
H_{cc}, H_{cp}	Henry's law constant	M/atm		Lee et al. [97]

Symbol	Name	Unit	Comment	Reference
H_{eff}	effective Henry's law coefficient	M/atm		Volkamer et al. [98]
K	Henry's law constant	M/atm		Martin and Damschen [99]
k	Henry's law constant	M/atm		Yoshizumi et al. [100]
K	Henry's law constant	M/atm		Hedgecock et al. [101]
K	partition coefficient	M/atm		Zhou and Mopper [102]
K	solubility	M/atm		Boggs and Buck [103]
K'	partial pressure equilibrium constant	M/atm		Warner and Weiss [104]
$K(h)$	Henry's law constant	M/atm		Lind and Kok [105]
k_H°	Henry's law constant	M/atm		Krysztofiak et al. [106]
K^H	Henry's law constant	M/atm		Brimblecombe [107]
K_0	solubility coefficient	M/atm		Weiss [108]
K_0	solubility coefficient	M/atm		Weiss and Price [109]
K_H	Henry coefficient	M/atm		Thomas et al. [110]
k_H	Henry constant	M/atm		Sauer [111]
k_H	Henry constant	M/atm		Keßel [112]
K_H	Henry's law coefficient	M/atm		Warneck [113]
K_H	Henry's law coefficient	M/atm		Warneck [114]
K_H	Henry's law coefficient	M/atm		Warneck [115]
K_H	Henry's law coefficient	M/atm		Betterton and Robinson [116]
K_H	Henry's law coefficient	M/atm		Warneck and Williams [117]
K_H	Henry's law coefficient	M/atm		Kish et al. [118]
K_H	Henry's law coefficient	M/atm		Johnson et al. [119]
k_H	Henry's law coefficient	M/bar		Warneck [120]
K_H	Henry's law constant	M/atm		Shon et al. [121]
K_H	Henry's law constant	M/atm		Hoffmann and Calvert [122]
K_H	Henry's law constant	M/atm		Iliuta and Larachi [123]
K_H	Henry's law constant	M/atm		Iverfeldt and Lindqvist [124]
K_H	Henry's law constant	M/atm		Ip et al. [125]
K_H	Henry's law constant	M/atm		Kutsuna and Horia [126]
K_H	Henry's law constant	M/atm		Kutsuna and Hori [127]
K_H	Henry's law constant	M/atm		Huang and Chen [128]
K_H	Henry's law constant	M/atm		Li et al. [129]
K_H	Henry's law constant	M/atm		Kutsuna [130]
K_H	Henry's law constant	M/atm		Leng et al. [131]
k_h	Henry's law constant	M/atm		Compernolle and Müller [132]
K_H	Henry's law constant	M/atm		Kim and Kim [133]
k_h	Henry's law constant	M/atm		Compernolle and Müller [134]
K_H	Henry's law constant	M/atm		Hough [135]
K_H	Henry's law constant	M/atm		Jacob [136]
K_H	Henry's law constant	M/atm		Dasgupta and Dong [137]
K_H	Henry's law constant	M/atm		Hwang and Dasgupta [138]
K_H	Henry's law constant	M/atm		Möller and Mauersberger [139]
K_H	Henry's law constant	M/atm		Keene and Galloway [140]
K_H	Henry's law constant	M/atm		Betterton [141]
K_h	Henry's law constant	M/atm		O'Sullivan et al. [142]
K_H	Henry's law constant	M/atm		Keene et al. [143]
K_H	Henry's law constant	M/atm		Martin [144]
K_H	Henry's law constant	M/atm		Jacob et al. [145]
K_H	Henry's law constant	M/atm		Maahs [146]
K_H	Henry's law constant	M/atm	also: gas-liquid partition coefficient	Warneck [147]
K_S	solubility constant	M/atm		Chameides [148]

Symbol	Name	Unit	Comment	Reference
K_S	solubility constant	M/atm		Chameides [149]
$K_{(aq)}$		M/atm		Hoffmann and Jacob [150]
K_{AW}	air-water equilibrium constant	M/atm		Saxena and Hildemann [151]
m/p		M/mmHg		Bohon and Claussen [152]
HL	Henry's law constant	M/atm		Staffelbach and Kok [153]
HLC	Henry's law constant	M/atm		von Hartungen et al. [154]
HLC	Henry's law constant	M/atm		Gautier et al. [155]
HLC	Henry's law constant	M/atm		Feigenbrugel et al. [156]
HLC	Henry's law constant	mol/(m^3 Pa)		Li et al. [157]
HLC, K_{PC}	Henry's law constant	M/atm		Schuhfried et al. [158]
	concentration/concentration H_s^{cc} (used in 63 publications)			
		1		Burkhard and Guth [159]
	distribution ratio	1		Tsibul'skii et al. [160]
	partition coefficient	1		Munson et al. [161]
	partition coefficient	1		Stoelting and Longshore [162]
	partition coefficient	1		Pearson and McConnell [163]
γ	activity coefficient	1		Hine and Mookerjee [164]
γ_S	Ostwald absorption coefficient	1		Ben-Naim and Wilf [165]
κ	distribution coefficient	1		Komiyama and Inoue [166]
λ	liquid/air partition coefficient	1		Johanson and Dynésius [167]
λ	Ostwald solubility coefficient	1		Steward et al. [168]
λ	Ostwald solubility coefficient	1		Edelist et al. [169]
λ	partition coefficient	1		Lerman et al. [170]
λ	partition coefficient	1		Falk et al. [171]
λ_A	partition coefficient	1		Sato and Nakajima [172]
H	gas-liquid absorption equilibrium constant	1		Komiyama and Inoue [173]
H	Henry's law constant	1		Scharlin and Battino [174]
H	Henry's law constant	1		Abraham et al. [175]
H	Henry's law constant	1		Terraglio and Manganelli [176]
H	Henry's law constant	1		Hales and Drewes [177]
H	solubility constant	1		Andrew and Hanson [178]
H_A	Henry's law coefficient	1		Snider and Dawson [179]
K		1		Eguchi et al. [180]
k	distribution coefficient	1		Hellmann [181]
K	distribution ratio	1		Vitenberg and Dobryakov [182]
K	gas-liquid partition coefficient	1		Rohrschneider [183]
K	gas-liquid partition coefficient	1		Ettre et al. [184]
K	gas-to-water partition coefficient	1		Li et al. [185]
K	gas/liquid partition coefficient	1		Park et al. [186]
K	Henry's law constant	1		Wen and Muccitelli [187]
K	liquid/gas partition coefficient	1		Guitart et al. [188]
K	partition coefficient	1		Vitenberg et al. [189]
K	partition coefficient	1		Schwarz and Wasik [190]
K	partition coefficient	1		Bakierowska and Trzeszczyński [191]
K	partition coefficient	1		Brown and Wasik [192]
K	partition coefficient	1		Burnett [193]
K	partition coefficient	1		Vitenberg et al. [194]
K	partition coefficient	1		Wasik and Tsang [195]
K	partition coefficient	1		Kolb et al. [196]
K	vapor-liquid equilibrium distribution coefficient	1		Kieckbusch and King [197]

Symbol	Name	Unit	Comment	Reference
$K(w/v)$	Henry's constant	1		Leistra [198]
k^0	zero pressure partition coefficient	1		Cooling et al. [199]
k^0	zero pressure partition coefficient	1		Khalfaoui and Newsham [200]
K^c_{AW}	air-water partition coefficient	1		Lei et al. [201]
K_h	Henry's law constant	1		Marsh and McElroy [202]
K_H	Henry's law constant	1		Battino et al. [203]
K_L	partition coefficient	1		Hartkopf and Karger [204]
K_W	gas-to-water partition coefficient	1		Abraham and Acree [205]
K_W	gas-water partition coefficient	1		Li and Carr [206]
K_W	partition coefficient	1		Abraham et al. [207]
K_W	partition coefficient	1		Caron et al. [208]
K_{AW}	air/water partition coefficient	1		Jönsson et al. [209]
$K_{V\rightarrow W}$	water-to-vapor distribution coefficient	1		Gibbs et al. [210]
$K_{W/A}$	partition coefficient	1		Zhang et al. [211]
K_{WA}	water-air partition coefficient	1		Hoff et al. [212]
L	distribution number	1		Fredenhagen and Liebster [213]
L	distribution number	1		Fredenhagen and Wellmann [214]
L	distribution number	1		Fredenhagen and Wellmann [215]
L	Ostwald coefficient	1		Clever et al. [216]
L^W	Ostwald solubility coefficient	1		Abraham et al. [217]
L_c	Ostwald concentration coefficient	1		Bebahani et al. [218]
L_W	Ostwald solubility coefficient	1		Abraham et al. [219]
W	partition coefficient	1		Sato and Nakajima [220]
LWAPC	water-to-air partition coefficient	1		Meylan and Howard [221]
	molality/pressure H^{bp}_s (used in 23 publications)			
		mol/(kg 1E5 Pa)		Wagman et al. [222]
		mol/(kg atm)		Barrett et al. [223]
H	Henry's law constant	mol/(kg atm)		Johnstone and Leppla [224]
H	Henry's law constant	mol/(kg atm)		Leu and Zhang [225]
K'	partial pressure equilibrium constant	mol/(kg atm)		Bu and Warner [226]
K'	solubility coefficient	mol/(kg atm)		Bullister et al. [227]
K'_H	Henry's law constant	mol/(kg atm)		Khan et al. [228]
K'_H	Henry's law constant	mol/(kg atm)		Khan et al. [229]
K'_H	Henry's law constant	mol/(kg atm)		Bowden et al. [230]
K'_H	Henry's law constant	mol/(kg atm)		Bowden et al. [231]
K'_H	Henry's law constant	mol/(kg atm)		Huthwelker et al. [232]
k_H	Henry's constant	mol/(kg 1E3 Pa)		Ueberfeld et al. [233]
K_H	Henry's law coefficient	mol/(kg atm)		Kampf et al. [234]
K_H	Henry's law constant	mol/(kg atm)		Clegg et al. [235]
K_H	Henry's law constant	mol/(kg atm)		Guo and Brimblecombe [236]
K_H	Henry's law constant	mol/(kg atm)		Clegg and Brimblecombe [237]
K_H	Henry's law constant	mol/(kg atm)		Watts and Brimblecombe [238]
K_H	Henry's law constant	mol/(kg bar)		Becker et al. [239]
K_H	Henry's law constant	mol/(kg bar)		Becker et al. [240]
K'_H	Henry's law constant	mol/(kg atm)		Khan and Brimblecombe [241]
K'_H	Henry's law constant	mol/(kg atm)		Brimblecombe et al. [242]
K'_H	Henry's law constant	mol/(kg atm)		Bowden et al. [243]
HLC	Henry's law constant	mol/(kg bar)		Hiatt [244]
	Bunsen coefficient (used in 16 publications)			

Symbol	Name	Unit	Comment	Reference
		1		Cady and Misra [245]
		1		Stock and Kuß [246]
	absorption coefficient	1		Winkler [247]
	absorption coefficient	1		Winkler [248]
	absorption coefficient	1		Winkler [249]
	Bunsen partition coefficient	1		Smith et al. [250]
	solubility coefficient	1		Douglas [251]
α	absorption coefficient	1		Bohr [252]
α	Bunsen coefficient	1		Park et al. [253]
α	Bunsen coefficient	1		Simpson and Lovell [254]
α	solubility coefficient	1		Meadows and Spedding [255]
α	solubility coefficient	1		Briner and Perrottet [256]
β	absorption coefficient	1		Winkler [257]
β	absorption coefficient	1		Winkler [258]
β	Bunsen coefficient	1		Wisegarver and Cline [259]
β	Bunsen solubility coefficient	1		Cline and Bates [260]
	amount fraction/pressure H_s^{xp} (used in 7 publications)			
		1/mmHg		Christie and Crisp [261]
	Henry's law constant	1/atm		Lide and Frederikse [262]
H	Henry's law constant	1/atm		Wilhelm et al. [263]
H, H'	Henry's law coefficient	1/atm		De Bruyn et al. [264]
K	Henry's law constant	1/atm		Wen and Muccitelli [187]
K_H	Henry's law constant	1/atm		Battino et al. [203]
x		1/atm		Battino et al. [265]
	Henry's law volatility constants H_v (used in 387 publications)			
	pressure/concentration H_v^{pc} (used in 152 publications)			
		Pa m^3/mol		MacBean [266]
	Henry's constant	atm m^3/mol		Staples et al. [267]
	Henry's constant	mmHg/M		Glew and Moelwyn-Hughes [268]
	Henry's law coefficient	Pa m^3/mol		Schroeder and Munthe [269]
	Henry's law constant	atm m^3/mol		Oliver [270]
	Henry's law constant	atm m^3/mol		Smith et al. [271]
	Henry's law constant	atm m^3/mol		Armbrust [272]
	Henry's law constant	atm m^3/mol		HSDB [273]
	Henry's law constant	bar m^3/mol		Lide and Frederikse [262]
	Henry's law constant	Pa m^3/mol		Friesen et al. [274]
	Henry's law constant	Pa m^3/mol		Siebers et al. [275]
	Henry's law constant	Pa m^3/mol		Siebers and Mattusch [276]
	Henry's law constant	Pa m^3/mol		Rubbiani [277]
κ	Henry coefficient	bar L/mol		Braun and Dransfeld [278]
κ'	Henry's law constant	atm/M		Templeton and King [279]
H		atm m^3/mol		Woodrow et al. [280]
H		atm/M		Jenkins and King [281]
H	Henry constant	atm m^3/mol		Savary et al. [282]
H	Henry constant	kPa m^3/mol		Sieg et al. [283]
H	Henry constant	Pa m^3/mol		Watanabe [284]

Symbol	Name	Unit	Comment	Reference
H	Henry's constant	atm m^3/mol		Gossett et al. [285]
H	Henry's constant	atm m^3/mol		Webster et al. [286]
H	Henry's constant	atm m^3/mol		Gossett [287]
H	Henry's constant	atm m^3/mol		Lincoff and Gossett [288]
H	Henry's constant	mmHg L/mol		Podoll et al. [289]
H	Henry's law coefficient	atm/M		Worthington and Wade [290]
H	Henry's law coefficient	Pa m^3/mol		Ballschmiter and Wittlinger [291]
H	Henry's law constant	atm cm^3/mol		Kim et al. [292]
H	Henry's law constant	atm L/mol		Rinker and Sandall [293]
H	Henry's law constant	atm m^3/mol		Leuenberger et al. [294]
H	Henry's law constant	atm m^3/mol		Yaws et al. [295]
H	Henry's law constant	atm m^3/mol		Ashworth et al. [296]
H	Henry's law constant	atm m^3/mol		Cotham and Bidleman [297]
H	Henry's law constant	atm m^3/mol		Hawthorne et al. [298]
H	Henry's law constant	atm m^3/mol		Mackay and Yeun [299]
H	Henry's law constant	atm m^3/mol		Rathbun and Tai [300]
H	Henry's law constant	atm m^3/mol		Yaws [301]
H	Henry's law constant	atm m^3/mol		Metcalfe et al. [302]
H	Henry's law constant	atm m^3/mol		Slater and Spedding [303]
H	Henry's law constant	atm m^3/mol		Mackay and Leinonen [304]
H	Henry's law constant	atm m^3/mol		Arbuckle [305]
H	Henry's law constant	atm m^3/mol		Petrasek et al. [306]
H	Henry's law constant	atm m^3/mol		Warner et al. [307]
H	Henry's law constant	atm m^3/mol		Saçan et al. [308]
H	Henry's law constant	atm m^3/mol		Schroy et al. [309]
H	Henry's law constant	atm m^3/mol		Wolfe et al. [310]
H	Henry's law constant	atm m^3/mol		Mabury and Crosby [311]
H	Henry's law constant	atm m^3/mol		Shen [312]
H	Henry's law constant	atm m^3/mol		Yaws et al. [313]
H	Henry's law constant	atm m^3/mol		Opresko et al. [314]
H	Henry's law constant	atm m^3/mol		Mackay et al. [315]
H	Henry's law constant	atm m^3/mol		Nicholson et al. [316]
H	Henry's law constant	atm m^3/mol		Gossett [317]
H	Henry's law constant	atm m^3/mol		Robbins et al. [318]
H	Henry's law constant	atm m^3/mol		Yaws and Yang [319]
H	Henry's law constant	atm m^3/mol		Westcott et al. [320]
H	Henry's law constant	atm m^3/mol		Burkhard et al. [321]
H	Henry's law constant	atm m^3/mol		Yin and Hassett [322]
H	Henry's law constant	atm m^3/mol		Tse et al. [323]
H	Henry's law constant	atm/M		Dacey et al. [324]
H	Henry's law constant	kPa m^3/mol		Govers and Krop [325]
H	Henry's law constant	kPa m^3/mol		Hansen et al. [326]
H	Henry's law constant	MPa m^3/mol		Zhang et al. [327]
H	Henry's law constant	Pa L/mol		Schüürmann [328]
H	Henry's law constant	Pa m^3/mol		Kurz and Ballschmiter [329]
H	Henry's law constant	Pa m^3/mol		Sagebiel et al. [330]
H	Henry's law constant	Pa m^3/mol		Paasivirta et al. [331]
H	Henry's law constant	Pa m^3/mol		ten Hulscher et al. [332]
H	Henry's law constant	Pa m^3/mol		Kucklick et al. [333]
H	Henry's law constant	Pa m^3/mol		Tremp et al. [334]
H	Henry's law constant	Pa m^3/mol		Suntio et al. [335]

Symbol	Name	Unit	Comment	Reference
H	Henry's law constant	Pa m^3/mol		Alaee et al. [336]
H	Henry's law constant	Pa m^3/mol		Delgado and Alderete [337]
H	Henry's law constant	Pa m^3/mol		Delgado and Alderete [338]
H	Henry's law constant	Pa m^3/mol		Sahsuvar et al. [339]
H	Henry's law constant	Pa m^3/mol		Shiu and Mackay [340]
H	Henry's law constant	Pa m^3/mol		Shiu and Ma [341]
H	Henry's law constant	Pa m^3/mol		Shiu and Mackay [342]
H	Henry's law constant	Pa m^3/mol		Tittlemier et al. [343]
H	Henry's law constant	Pa m^3/mol		Niinemets and Reichstein [344]
H	Henry's law constant	Pa m^3/mol		Tittlemier et al. [345]
H	Henry's law constant	Pa m^3/mol		Ferreira [346]
H	Henry's law constant	Pa m^3/mol		Li et al. [347]
H	Henry's law constant	Pa m^3/mol		Fang et al. [348]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [349]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [350]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [351]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [352]
H	Henry's law constant	Pa m^3/mol		Cetin et al. [353]
H	Henry's law constant	Pa m^3/mol		Otto et al. [354]
H	Henry's law constant	Pa m^3/mol		Fang Lee [355]
H	Henry's law constant	Pa m^3/mol		Shen and Wania [356]
H	Henry's law constant	Pa m^3/mol		Lei et al. [357]
H	Henry's law constant	Pa m^3/mol		Riederer [358]
H	Henry's law constant	Pa m^3/mol		Calamari et al. [359]
H	Henry's law constant	Pa m^3/mol		Xiao et al. [360]
H	Henry's law constant	Pa m^3/mol		McPhedran et al. [361]
H	Henry's law constant	Pa m^3/mol		Lee et al. [362]
H	Henry's law constant	Pa m^3/mol		Bobra et al. [363]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [364]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [365]
H	Henry's law constant	Pa m^3/mol		Mackay et al. [366]
H	Henry's law constant	Pa m^3/mol		Shiu et al. [367]
H	Henry's law constant	Pa m^3/mol		De Maagd et al. [368]
H	Henry's law constant	Pa m^3/mol		Drouillard et al. [369]
H	Henry's law constant	Pa m^3/mol		Shiu et al. [370]
H	Henry's law constant	Pa m^3/mol		Hauff et al. [371]
H	Henry's law constant	Pa m^3/mol		Fischer and Ballschmiter [372]
H	Henry's law constant	Pa m^3/mol		Jantunen and Bidleman [373]
H, H'	Henry's law constant	Pa m^3/mol		Bamford et al. [374]
H, H_c	Henry's law constant	atm m^3/mol		Chen et al. [375]
H, k_H	Henry's law constant	atm m^3/mol		Heron et al. [376]
H, K_{AW}	Henry's law constant	kPa m^3/mol		Mackay and Shiu [377]
H, K_{AW}	Henry's law constant	Pa m^3/mol		Shunthirasingham et al. [378]
H, Hc	Henry's constant	atm m^3/mol		Chang and Criddle [379]
h_2	Henry's law constant	atm/M		Deno and Berkheimer [380]
H_c	Henry's constant	atm m^3/mol		Kondoh and Nakajima [381]
H_c	Henry's constant	mmHg/M		Smith et al. [382]
H_W	Henry's law constant	Pa m^3/mol		Kuramochi et al. [383]
H_w	Henry's law constant	Pa m^3/mol		Kuramochi et al. [384]
H_{pc}	Henry's law constant	Pa m^3/mol		Copolovici and Niinemets [385]
H_{pc}, H_{px}, H_{cc}	Henry's law constant	Pa m^3/mol		Cimetiere and de Laat [386]

Symbol	Name	Unit	Comment	Reference
K^c_{AW}	air-water partition coefficient	Pa m^3/mol		Lei et al. [201]
k_H	Henry constant	kPa m^3/mol		Haynes [387]
K_H	Henry's constant	atm cm^3/mol		Zhang and Pawliszyn [388]
k_H	Henry's constant	GPa		Fernández-Prini et al. [389]
K_H	Henry's law constant	atm m^3/mol		Perlinger et al. [390]
K_H	Henry's law constant	atm m^3/mol		Wolfe et al. [391]
K_h	Henry's law constant	atm/M		Kosak-Channing and Helz [392]
K_H	Henry's law constant	Pa m^3/mol		Bamford et al. [393]
K_H	Henry's law constant	Pa m^3/mol		Bamford et al. [394]
K_H	Henry's law constant	Pa m^3/mol		Charles and Destaillats [395]
k_H	Henry's law constant	Pa m^3/mol		Destaillats and Charles [396]
k_H	Henry's law constant	Pa m^3/mol		Paasivirta and Sinkkonen [397]
K_H	Henry's law constant	Pa m^3/mol		Lau et al. [398]
k_H, H_{cc}	Henry's law constant	Pa m^3/mol		Reza and Trejo [399]
K_H, K_{AW}	Henry's law constant	Pa m^3/mol		Wu and Chang [400]
K_{AW}	air-water partition coefficient	Pa m^3/mol		Cousins and Mackay [401]
K_{aw}	Henry's law constant	atm m^3/mol		Arp and Schmidt [402]
K_{aw}, H_c	air/water partition coefficient	kPa m^3/mol		Ryu and Park [403]
Hc	Henry's law constant	kPa m^3/mol		Wang and Wong [404]
He	Henry coefficient	atm cm^3/mol		Joosten and Danckwerts [405]
HLC	Henry's law constant	1E4 atm m^3/mol		Dunnivant et al. [406]
HLC	Henry's law constant	atm L/mol		Myrdal and Yalkowsky [407]
HLC	Henry's law constant	atm m^3/mol		Dunnivant and Elzerman [408]
HLC	Henry's law constant	atm m^3/mol		Sabljić and Güsten [409]
HLC	Henry's law constant	atm m^3/mol		Dunnivant et al. [410]
HLC	Henry's law constant	atm m^3/mol		Murphy et al. [411]
HLC	Henry's law constant	Pa m^3/mol		Bamford et al. [412]
HLC	Henry's law constant	Pa m^3/mol		Santl et al. [413]
HLC	Henry's law constant	Pa m^3/mol		Krop et al. [414]
HLC, K	Henry's law constant	atm m^3/mol		Brunner et al. [415]
	concentration/concentration H^{cc}_{v} (used in 133 publications)			
		1		Feldhake and Stevens [416]
	air-water partition coefficient	1		Atlas et al. [417]
	air-water partition coefficient	1		Buttery et al. [418]
	distribution coefficient	1		Wolfenden [419]
	distribution coefficient	1		Bone et al. [420]
	distribution constant	1		WHO [421]
	Henry's constant	1		Marin et al. [422]
	Henry's law coefficient	1		Schroeder and Munthe [269]
	partition coefficient	1		Wolfenden and Williams [423]
H	air-water partition coefficient	1		McLachlan et al. [424]
H	distribution constant	1		Lindqvist and Rodhe [425]
H	distribution ratio	1		Glotfelty et al. [426]
H	Henry coefficient	1		Kanefke [427]
H	Henry's constant	1		Ervin et al. [428]
H	Henry's constant	1		Nirmalakhandan and Speece [429]
H	Henry's constant	1		Jayasinghe et al. [430]
H	Henry's constant	1		Anderson [431]
H	Henry's constant	1		Hoyt [432]
H	Henry's gas law constant	1		Pankow et al. [433]

Symbol	Name	Unit	Comment	Reference
H	Henry's law coefficient	1		Dewulf et al. [434]
H	Henry's law coefficient	1		Turner et al. [435]
H	Henry's law coefficient	1		Johnson and Harrison [436]
H	Henry's law constant	1		Moore [437]
H	Henry's law constant	1		Schoene and Steinhanses [438]
H	Henry's law constant	1		Pfeifer et al. [439]
H	Henry's law constant	1		David et al. [440]
H	Henry's law constant	1		Harrison et al. [441]
H	Henry's law constant	1		Sheikheldin et al. [442]
H	Henry's law constant	1		Yoshida et al. [443]
H	Henry's law constant	1		Southworth [444]
H	Henry's law constant	1		Eastcott et al. [445]
H	Henry's law constant	1		Yurteri et al. [446]
H	Henry's law constant	1		Bierwagen and Keller [447]
H	Henry's law constant	1		Ji and Evans [448]
H	Henry's law constant	1		Iverfeldt and Persson [449]
H	Henry's law constant	1		Fischer et al. [450]
H	Henry's law constant	1		Shimotori and Arnold [451]
H	Henry's law constant	1		Lamarche and Droste [452]
H	Henry's law constant	1		Balls [453]
H	Henry's law constant	1		Görgényi et al. [454]
H	Henry's law constant	1		Yoshida et al. [455]
H	Henry's law constant	1		Plassmann et al. [456]
H	Henry's law constant	1		Giardino et al. [457]
H	Henry's law constant	1		Mazzoni et al. [458]
H	Henry's law constant	1		Liu et al. [459]
H	Henry's law constant	1		Durham et al. [460]
H	Henry's law constant	1		Dilling [461]
H	Henry's law constant	1		Liss and Slater [462]
H	Henry's law constant	1		Moore et al. [463]
H	Henry's law constant	1		Dewulf et al. [464]
H	Henry's law constant	1		Tancrède and Yanagisawa [465]
H	Henry's law constant	1		Hunter-Smith et al. [466]
H	Henry's law constant	1		Nirmalakhandan et al. [467]
H	Henry's law constant	1		Allen et al. [468]
H	Henry's law constant	1		Hilal et al. [469]
H	partition coefficient	1		Atlas et al. [470]
H	partition coefficient	1		Zafiriou and McFarland [471]
H, H'	Henry's law constant	1		Cetin and Odabasi [472]
H'	Henry's law constant	1		Odabasi et al. [473]
H_c	Henry's constant	1		Breiter et al. [474]
H_c	Henry's constant	1		Munz and Roberts [475]
H_c	Henry's constant	1		Chai et al. [476]
H_c	Henry's constant	1		Garbarini and Lion [477]
H_c	Henry's constant	1		Gupta et al. [478]
H_c	Henry's constant	1		Teja et al. [479]
H_c	Henry's law constant	1		Peng and Wan [480]
H_c	Henry's law constant	1		Vane and Giroux [481]
H_C	Henry's law constant	1		Ayuttaya et al. [482]
H_c	Henry's law constant	1		Kochetkov et al. [483]
H_c, H'	Henry's law constant	1		Hamelink et al. [484]

Symbol	Name	Unit	Comment	Reference
H_P	Henry's law constant	1		Ramachandran et al. [485]
H_x, H_c	Henry's law constant	1		Munz and Roberts [486]
H_x, H_y	partition coefficient	1		Dubik et al. [487]
H_{cc}	Henry's law constant	1		Staudinger and Roberts [488]
H_{px}, H_{cc}, H_{pc}	Henry's law constant	1		Staudinger and Roberts [489]
K	air-water distribution ratio	1		Mirvish et al. [490]
K	air-water partition coefficient	1		Buttery et al. [491]
K	air-water partition coefficient	1		Buttery et al. [492]
K	distribution coefficient	1		Palmer et al. [493]
k	Henry's constant	1		Nelson and Hoff [494]
K	Henry's law constant	1		Elliott and Rowland [495]
k	Henry's law constant	1		Fu et al. [496]
K	partition coefficient	1		Dilling et al. [497]
K	partition coefficient	1		Friant and Suffet [498]
K'_H	Henry's constant	1		Bobadilla et al. [499]
K'_H	Henry's law constant	1		Diaz et al. [500]
K^{∞}	Henry's law constant	1		Hwang et al. [501]
K^c_{WA}, K^p_{AW}, K^x_{AW}	water-air partition coefficient	1		Lei et al. [502]
K_A	air-water partition coefficient	1		Kawamoto and Urano [503]
K_D	distribution coefficient	1		Talmi and Mesmer [504]
k_H	Henry's constant	1		Fernández-Prini et al. [389]
K_H	Henry's law constant	1		Yates and Gan [505]
k_H	Henry's law constant	1		Andersson et al. [506]
k_H	Henry's law constant	1		Helburn et al. [507]
K_H	Henry's law constant	1		Chesters et al. [508]
K_H	Henry's law constant	1		Rice et al. [509]
K_H	partition coefficient	1		Gan and Yates [510]
K_{AW}	air-water partition coefficient	$\mathrm{Pa\,m^3/J}$		Abou-Naccoul et al. [511]
K_i	distribution coefficient	1		Przyjazny et al. [512]
k_v	partition coefficient	1		Chaintreau et al. [513]
$K_{air/water}$	air/water partition coefficient	1		Goss et al. [514]
K_{AW}		1		Xiao et al. [515]
K_{AW}	air-water partition coefficient	1		Amoore and Buttery [516]
K_{aw}	air-water partition coefficient	1		Roberts and Pollien [517]
K_{AW}	air-water partition coefficient	1		Li et al. [518]
K_{aw}	air-water partition coefficient	1		de Wolf and Lieder [519]
K_{aw}	air-water partition coefficient	1		Muir et al. [520]
K_{AW}	air-water partition coefficient	1		Ma et al. [521]
K_{AW}	air-water partition constant	1		Arp et al. [522]
K_{AW}	air/water partition coefficient	1		Sarraute et al. [523]
K_{AW}	air/water partition coefficient	1		Dohányosová et al. [524]
K_{AW}	equilibrium partition coefficient	1		Zhang et al. [525]
K_{AW}	Henry's law coefficient	1		Sieg et al. [526]
K_{AW}	Henry's law constant	1		van Roon et al. [527]
K_{aw}	partition coefficient	1		Wania and Dugani [528]
K_{AW}	partition coefficient	1		Plassmann et al. [529]
K_{AW}	partition coefficient	1		Xu and Kropscott [530]
K_{AW}	partition coefficient	1		Xu and Kropscott [531]
K_{GW}	gas-water partition coefficient	1		Fischer and Ballschmiter [372]
K_{GW}	gas-water partition coefficient	1		Hauff et al. [371]
K_{gw}	gas/water partition coefficient	1		Taft et al. [532]

Symbol	Name	Unit	Comment	Reference
K_{WA}	water-air partition coefficient	1		Hoff et al. [212]
p_c	partitioning coefficient	1		Cheng et al. [533]
p_c	partitioning coefficient	1		Cheng et al. [534]
S^*	dimensionless solubility	1		Elliott [535]
Hc	Henry's coefficient	1		Bissonette et al. [536]
Hc	Henry's constant	1		Chiang et al. [537]
Hc	Henry's constant	1		Ryan et al. [538]
Hc	Henry's law constant	1		Wong and Wang [539]
HLC	Henry's law constant	1		Fendinger and Glotfelty [540]
HLC	Henry's law constant	1		Altschuh et al. [541]
HLC	Henry's law constant	1		Fendinger and Glotfelty [542]
HLC	Henry's law constant	1		Fendinger et al. [543]
		pressure/amount fraction H_{v}^{px} (used in 96 publications)		
		atm		Abraham [544]
		atm		Abraham and Nasehzadeh [545]
		atm		Abraham [546]
		atm		Emel'yanenko et al. [547]
		atm		Hertel and Sommer [548]
		kPa		Dallos et al. [549]
		kPa		Wright et al. [550]
		mmHg		Signer et al. [551]
		Pa		Fichan et al. [552]
	Henry's constant	Pa		Marin et al. [422]
	Henry's law constant	mmHg/ppm		Sanders and Seiber [553]
	Henry's law constant	mmHg		Ross and Hudson [554]
	Henry's constant	MPa		Lekvam and Bishnoi [555]
H	Henry coefficient	atm		Hamm et al. [556]
H	Henry coefficient	MPa		Reichl [557]
H	Henry coefficient	MPa		Zheng et al. [558]
H	Henry coefficient	MPa		Maaßen [559]
H	Henry constant	kPa		Tabai et al. [560]
H	Henry constant	mmHg		Rytting et al. [561]
H	Henry fugacity	Pa		Rettich et al. [562]
H	Henry's constant	atm		Conway et al. [563]
H	Henry's constant	atm		Holzwarth et al. [564]
H	Henry's constant	bar		Martikainen et al. [565]
H	Henry's constant	GPa		Jou and Mather [566]
H	Henry's constant	GPa		Carroll et al. [567]
H	Henry's constant	GPa		Rettich et al. [568]
H	Henry's constant	kPa		Olson [569]
H	Henry's constant	kPa		Abd-El-Bary et al. [570]
H	Henry's constant	kPa		Falabella et al. [571]
H	Henry's constant	kPa		Falabella [572]
H	Henry's constant	kPa		Falabella and Teja [573]
H	Henry's constant	kPa		Chapoy et al. [574]
H	Henry's constant	MPa		Chapoy et al. [575]
H	Henry's constant	MPa		Tsonopoulos and Wilson [576]
H	Henry's constant	MPa		Heidman et al. [577]
H	Henry's constant	MPa		Carroll and Mather [578]
H	Henry's constant	MPa		Carroll et al. [579]

Symbol	Name	Unit	Comment	Reference
H	Henry's law coefficient	bar		Warneck [580]
H	Henry's law constant	1E2 kPa		Mohebbi et al. [581]
H	Henry's law constant	atm		Yaws et al. [295]
H	Henry's law constant	atm		Riveros et al. [582]
H	Henry's law constant	atm		Roth and Sullivan [583]
H	Henry's law constant	atm		Glew and Hames [584]
H	Henry's law constant	atm		Blatchley et al. [585]
H	Henry's law constant	atm		Yaws et al. [313]
H	Henry's law constant	atm		Yaws and Yang [319]
H	Henry's law constant	GPa and bar		Bonifácio et al. [586]
H	Henry's law constant	kPa		Zhu et al. [587]
H	Henry's law constant	kPa		Dohnal and Fenclová [588]
H	Henry's law constant	kPa		Straver and de Loos [589]
H	Henry's law constant	kPa		Sotelo et al. [590]
H	Henry's law constant	kPa		Nielsen et al. [591]
H	Henry's law constant	MPa		Coquelet and Richon [592]
H	Henry's law constant	MPa		Hovorka and Dohnal [593]
H	Henry's law constant	MPa		Dohnal and Hovorka [594]
H	Henry's law constant	Pa		Rettich et al. [595]
H	Henry's law constant	Torr		Arijs and Brasseur [596]
H'	Henry constant	bar		Severit [597]
H_c	Henry's law constant	atm		Peng and Wan [480]
H_c	Henry's law constant	MPa		Lau et al. [598]
H_{12}	Henry's law constant	kPa		Beneš and Dohnal [599]
K		atm		Ayers [600]
K	distribution coefficient	atm		Leighton and Calo [601]
k	Henry coefficient	atm		Sanemasa [602]
k	Henry coefficient	atm		Benson et al. [603]
K	Henry's constant	bar		Clever et al. [604]
k	Henry's constant	Pa		Lodge and Danso [605]
k	Henry's law constant	1E4 Pa		Khalfaoui and Newsham [606]
K	Henry's law constant	mmHg		Loomis [607]
k	Henry's law constant	Torr		Keeley et al. [608]
k^0	Henry's constant	bar		Crovetto [609]
K^∞	limiting separation factor	atm		Hertel and Sommer [610]
K^∞	limiting separation factor	atm		Hertel et al. [611]
K^H	Henry's law constant	atm		Abraham and Matteoli [612]
k_2	Henry constant	atm		Krause and Benson [613]
K_H	Henry's constant	atm		Peng and Wan [614]
k_H	Henry's constant	GPa		Crovetto et al. [615]
k_H	Henry's constant	MPa		Plyasunov [616]
K_H	Henry's law coefficient	MPa		Iliuta and Larachi [617]
K_H	Henry's law constant	1E7 Pa		Sanemasa et al. [618]
K_H	Henry's law constant	1E7 Pa		Sanemasa et al. [619]
K_H	Henry's law constant	atm		Green and Frank [620]
k_H	Henry's law constant	kPa		Bernauer et al. [621]
K_H	Henry's law constant	kPa		Bernauer and Dohnal [622]
k_H	Henry's law constant	kPa		Bernauer and Dohnal [623]
k_H	Henry's law constant	kPa		Brockbank et al. [624]
K_H	Henry's law constant	kPa		Dohnal et al. [625]
K_H	Henry's law constant	kPa		Fenclová et al. [626]

Symbol	Name	Unit	Comment	Reference
K_H	Henry's law constant	Torr		Tucker et al. [627]
K_H, K_{AW}	Henry's law constant	MPa		Sarraute et al. [628]
K_H	Henry's law constant	Pa		Sarraute et al. [523]
K_H	Henry's law constant	kPa		Abou-Naccoul et al. [511]
K_H	Henry's law constant	MPa		Dohányosová et al. [524]
p/N		mmHg		Butler and Ramchandani [629]
p/N	distribution ratio	mmHg		Butler et al. [630]
HLC	Henry's law constant	kPa		Xie et al. [631]
		pressure/molality H_v^{pb} (used in 6 publications)		
		atm kg/mol		Kelley and Tartar [632]
		mmHg/(mmol/kg)		Saylor et al. [633]
H	Henry's constant	atm kg/mol		Yoo et al. [634]
H	Henry's constant	atm kg/mol		Edwards et al. [635]
K_H	Henry constant	bar kg/mol		Suleimenov and Krupp [636]
k_{aq}	Henry's law constant	atm kg/mol		Hill et al. [637]
		Other (used in 38 publications)		
			ΔG and ΔH	Parsons et al. [638]
			ΔG and ΔH	Parsons et al. [639]
		1	ΔG and ΔH for H_v^{cc}	Cabani et al. [640]
		atm	ΔG and ΔH for H_v^{px}	Cabani et al. [641]
		atm	ΔG and ΔH for H_v^{px}	Cabani et al. [642]
		atm	ΔG and ΔH for H_v^{px}	Cabani et al. [643]
		atm	ΔG and ΔH for H_v^{px}	Andon et al. [644]
		atm	ΔG and ΔH for H_v^{px}	Cabani et al. [645]
		atm	ΔG and ΔH for H_v^{px}	Cabani et al. [646]
		atm	ΔG for H_v^{px}	Rochester and Symonds [647]
			-lg s and p_{sat}	Irmann [648]
			aq. amount fraction and p in psia	Inga and McKetta [649]
			aq. solution in % and p in mmHg	Klein [650]
			special definition	Fishbein and Albro [651]
			special definition	Berdnikov and Bazhin [652]
		ml(gas)/ml(H2O)	special definition	Hempel [653]
		ml(STDair)/liter(aq)	special definition	Carpenter [654]
	absorption coefficient		similar to α	Rex [655]
	Henry's law constant	atm	ΔG and ΔH for H_v^{px}	Arnett and Chawla [656]
S	Kuenen coefficient	cm^3/g		Ashton et al. [657]
	solubility	mass%/atm	special definition	Booth and Jolley [658]
α, A, l, q				Dean [659]
λ	solubility coefficient		special definition	Kruis and May [660]
H	Henry's constant		special definition	Chen et al. [661]
H	Henry's constant	kPa/mass%	special definition	McLinden [662]
H	Henry's law constant	dyne cm/g		Chiou et al. [663]
H	Henry's law constant		special definition	Thompson and Zafiriou [664]
H	solubility constant		special definition	St-Pierre et al. [665]
H, K_{aw}, H_c	Henry's law constant		miscellaneous definitions	Park et al. [666]
K_H	Henry's law constant	1/atm	product with acidity constant	Clegg et al. [667]
K_H	Henry's law constant	1/atm	product with acidity constant	Clegg and Brimblecombe [668]
K_H	Henry's law constant	1/atm	product with acidity constant	Carslaw et al. [669]

Symbol	Name	Unit	Comment	Reference
K_H	Henry's law constant	$mol^2/(kg^2\,atm)$	product with acidity constant	Clegg and Brimblecombe [670]
K_H	Henry's law constant	$mol^2/(kg^2\,atm)$	product with acidity constant	Brimblecombe and Clegg [671]
K_H	Henry's law constant	$mol^2/(kg^2\,atm)$	product with acidity constant	Brimblecombe and Clegg [672]
KS	solubility constant	M^2/atm	product with acidity constant	Chameides and Stelson [673]
s_0			special definition	Morrison and Johnstone [674]
miscellaneous	miscellaneous	miscellaneous		Fogg and Sangster [675]
		Effective Henry's law constants		
H_{eff}	effective Henry's law constant	M/atm		Lelieveld and Crutzen [23]
K_H	effective Henry's law coefficient	M/atm		Pandis and Seinfeld [43]
H	effective Henry's law coefficient	M/atm		Schwartz [44]
H^*	effective Henry's law constant	M/atm		Betterton [90]
H^*	effective Henry's law constant	M/atm		McNeill et al. [95]
H_{eff}	effective Henry's law coefficient	M/atm		Volkamer et al. [98]
H_{eff}	effective solubility constant	M/atm		Chameides [149]
H^*	effective Henry's law constant	mol/(kg atm)		Huthwelker et al. [232]
H^*	apparent Henry's law constant	M/atm		Seyfioglu and Odabasi [89]
K^*	apparent Henry's law coefficient	M/atm		Zhou and Mopper [102]

Symbol	Name	Unit	Comment	Reference
Henry's law constants for non-aqueous solutions				
He	Henry's law constant	kPa m^3/kmol		Ling et al. [676]
He	miscellaneous	kPa m^3/kmol		Liu et al. [677]
K_p	Henry's law constant	atm		Sugiyama et al. [678]
C	Henry's law constant	$psia^{-1}$		Elbishlawi and Spencer [679]
k_H	Henry's law constant	?	in Russian	Blank [680]
He	Henry's constant	kPa m^3/kmol	p/c	Sema et al. [681]
$K_{H3,12}$	Henry's law constant	Pa	p/x	Mainar et al. [682]
k_H	Henry's law constant	MPa	f/x	Minnick and Shiflett [683]
$h^{(0)}_{H,x}$	Henry's law constant	MPa	p/x	Shokouhi et al. [684]
H	Henry's law constant	MPa	p/x	Song et al. [685]
k_H	Henry's constant	MPa	p/x	Safarov et al. [686]
H	Henry's constant	MPa	f/x	He et al. [687]
H_{21}	Henry's law constant	MPa	p/x	Jou et al. [688]
H	Henry's law constant	MPa	p/x	Linnemann et al. [689]
k_H	Henry's law constant	MPa	p/x	Décultot et al. [690]
H	apparent Henry's law constant	MPa	p/x	Hajiw et al. [691]
H	Henry's constant	MPa	f/x	Harifi-Mood [692]
H_x	Henry's law constant	Pa m^3/mol	p/c	Zhao et al. [693]
k_H	Henry's constant	MPa (per mol/kg)	f/b	Böttger et al. [694]
H_m, H_x	Henry's constant	MPa kg/mol, MPa	f/b, f/x	Li et al. [695]
H	Henry's constant	kPa	f/x	Liu et al. [696]
H	Henry's law constant	MPa	p/x	Nikolaychuk et al. [697]
K_H	Henry's law constant	kPa	p/x	Haidl and Dohnal [698]
K^H_A	limiting Henry's law constant	mm l/mol	p/c	Taha and Christian [699]
K_H	Henry's law constant	atm	p/x	Goldman [700]
k	Henry's law constant	mm	p/x	Brown and Melchiore [701]
H_{21}	Henry's constant	Atm	f/x	Lenoir et al. [702]
L_{21}, H_{21}	Ostwald coefficient, Henry fugacity	1, Pa	c/c, p/x	Hesse et al. [703]
H_g	Henry's law constant	kPa	?	Miyano et al. [704]
H_1	Henry's law constant	atm	p/w	Schotte [705]
Adsorption onto/into (semi-) solids				
K	Henry's law constant	(molecules per cavity) / Torr	c/p (sorption in zeolites)	Ruthven and Derrah [706]
k	Henry's law constant	mol g^{-1} $Torr^{-1}$	amount absorbed in active carbon/p	Boucher and Everett [707]
K_H	Henry's law constant	kPa	in bitumen	Xu and Hepler [708]
—	—	—	magma, garnet, olivine	Beattie [709]
D	solid-liquid partition coefficient	weight%/weight%	metal partitioning in iron meteorites	Chabot et al. [710]

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