

The ***n*-octanol-water partition coefficient**, K_{ow} is a **partition coefficient** for the two-phase system consisting of ***n*-Octanol** and Water.^[1] K_{ow} is also frequently referred to by the symbol P, especially in the English literature.

K_{ow} serves as a measure of the relationship between **lipophilicity** (fat solubility) and **hydrophilicity** (water solubility) of a substance. The value is greater than one if a substance is more soluble in fat-like solvents such as *n*-octanol, and less than one if it is more soluble in water.

If a substance is present as several **chemical species** in the octanol-water system due to **association** or **dissociation**, each species is assigned its own K_{ow} value. A related value, D, does not distinguish between different species, only indicating the concentration ratio of the substance between the two phases.

- Definition of the K_{ow} or P-value

The K_{ow} or P-value always only refers to a single **species** or substance:

$$K_{ow} = P = \frac{c_o^{S_i}}{c_w^{S_i}}$$

mit:

- $c_o^{S_i}$ concentration of species i of a substance in the octanol-rich phase
- $c_w^{S_i}$ concentration of species i of a substance in the water-rich phase

If different species occur in the octanol-water system by dissociation or association, several P-values and one D-value exist for the system. If, on the other hand, the substance is only present in a single species, the P and D values are identical.

P is usually expressed as a **common logarithm**, i.e. Log P (also Log P_{ow} or, less frequently, Log pOW):

$$\log P = \log \frac{c_o^{S_i}}{c_w^{S_i}} = \log c_o^{S_i} - \log c_w^{S_i}$$

Log P is positive for lipophilic and negative for hydrophilic substances or species.

Substance	log K_{ow}	T
Acetamide	-1.155	25 °C
Methanol	-0.824	19 °C
Formic acid	-0.413	25 °C
Diethyl ether	0.833	20 °C
<i>p</i> -Dichlorobenzene	3.370	25 °C
Hexamethylbenzene	4.610	25 °C
2,2',4,4',5-Pentachlorobiphenyl	6.410	Ambient