

25.2 PARTITION COEFFICIENTS- CONTENTS

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Learning outcomes

Candidates should be able to:

1. state what is meant by the term partition coefficient, K_{pc}
2. calculate and use a partition coefficient for a system in which the solute is in the same physical state in the two solvents
3. Understand the factors affecting the numerical value of a partition coefficient in terms of the polarities of the solute and the solvents used

Introduction

Note that partition coefficient = distribution coefficient

What is meant by immiscible?

Partition coefficient K_{pc} : the **ratio** of the **concentrations of a solute in two** different **immiscible solvents in contact** with each other when **equilibrium** has been established

Immiscible solvents are solvents which do not mix.

Iodine does appear to dissolve in water to a very small extent. This is due to the equilibrium



The position of equilibrium is well over to the left. The iodine itself is not soluble, but the ions formed are, and so the iodine appears to dissolve very slightly. Note that solutions of iodine in the laboratory are made up by dissolving iodine in potassium iodide. The ion I_3^- is formed, which is soluble in water.

Various factors need to be considered when thinking about the relative solubilities of a solute in two solvents:

- » the relative polarities of the solute and solvent molecules
- » the possibility of specific interactions between the solute and the solvent, such as hydrogen bonding, instantaneous dipole-induced dipole attractions and permanent dipole attractions.

The technique of **solvent extraction** depends on partition.

<https://www.youtube.com/watch?v=udDDQuO4Mh8>

In paper chromatography, the different partition coefficients of the components in a mixture correspond to

their relative solubilities in the two solvents.

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