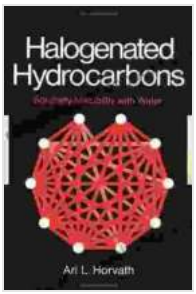
Halogenated Hydrocarbons: Solubility and Miscibility with Water

Halogenated hydrocarbons are a class of organic compounds that contain one or more halogen atoms (fluorine, chlorine, bromine, or iodine) bonded to a carbon atom. They are widely used in industry as solvents, degreasers, and refrigerants. However, halogenated hydrocarbons are also known to be toxic and persistent environmental pollutants.



Halogenated Hydrocarbons: Solubility-Miscibility with Water by A.L. Horvath

4.4 out of 5

Language	: German
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Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Print length	: 428 pages

The solubility and miscibility of halogenated hydrocarbons with water are important factors that affect their environmental fate and transport. Solubility is the ability of a substance to dissolve in a solvent, while miscibility is the ability of two liquids to mix together in all proportions. The solubility and miscibility of halogenated hydrocarbons with water are influenced by a number of factors, including the type of halogen atom, the number of halogen atoms, and the molecular weight of the compound.

Factors Affecting Solubility and Miscibility

The solubility of halogenated hydrocarbons in water decreases with increasing halogenation. This is because the halogen atoms are more electronegative than carbon, and they attract electrons away from the carbon atom. This makes the carbon atom more positive, and it is less likely to interact with the polar water molecules. The number of halogen atoms also affects solubility. The more halogen atoms that are present, the less soluble the compound is in water.

The molecular weight of a halogenated hydrocarbon also affects its solubility in water. The larger the molecular weight, the less soluble the compound is in water. This is because larger molecules are less able to penetrate the water molecules.

The miscibility of halogenated hydrocarbons with water also decreases with increasing halogenation. This is because the halogen atoms make the molecule more hydrophobic, or water-repelling. The larger the molecule, the more hydrophobic it is, and the less miscible it is with water.

Environmental Implications

The solubility and miscibility of halogenated hydrocarbons with water have important implications for their environmental fate and transport. Halogenated hydrocarbons that are soluble in water are more likely to be transported in groundwater and surface water. They are also more likely to be taken up by aquatic organisms. Halogenated hydrocarbons that are miscible with water are more likely to spread in the environment and to contaminate drinking water supplies.

The toxicity of halogenated hydrocarbons also affects their environmental impact. Halogenated hydrocarbons are known to be toxic to aquatic

organisms, and some halogenated hydrocarbons are also known to be carcinogenic. The toxicity of halogenated hydrocarbons is increased by the presence of halogen atoms. The more halogen atoms that are present, the more toxic the compound is.

Halogenated hydrocarbons are a class of toxic and persistent environmental pollutants. The solubility and miscibility of halogenated hydrocarbons with water are important factors that affect their environmental fate and transport. The solubility of halogenated hydrocarbons in water decreases with increasing halogenation, while the miscibility of halogenated hydrocarbons with water decreases with increasing halogenation and molecular weight.

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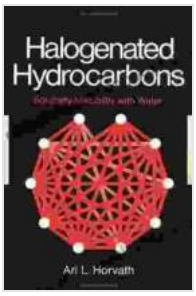
References

1. U.S. Environmental Protection Agency. (2018). Toxicological



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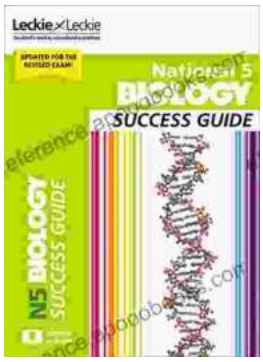

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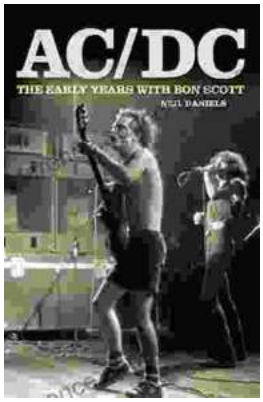

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