

NOTE

Water: Nature's Scissors

S.I. POTHEN*

Department of Chemistry, Government Higher Secondary School
Bundeli-491 888, (Rajnandgaon), India

The present paper explains the solubility of water.

Water is a highly interesting and unique substance from the chemical point of view. Water is essential to all forms of life. It is the most abundant compound in the biosphere. In nature, water is found in all three phases solid, liquid and gas. An important milestone in the development of modern chemistry is Cavendish's experiment in the second half of the eighteenth century which established the composition of water as consisting of two parts of hydrogen and one part of oxygen.

A molecule of water consists of two hydrogen atoms joined to an oxygen atom by covalent bonds. The molecular dimensions in the gas phase are shown¹. The molecule is nonlinear and with an H—O—H angle equal to 104.5°, looks like a scissors.

There are two lone pairs of electrons on the oxygen atom. Because of the high electronegativity of oxygen water molecule is highly polar; the oxygen atom has partial negative charge and the hydrogen atoms have partial positive charges.



Attraction between the H atom of one molecule and the O of another leads to association of H_2O molecules into a giant cluster in liquid water. In cluster, water molecules are held together by hydrogen bonds.

The term solubility describes the qualitative idea of the dissolving process. A solute can be added to a solvent to produce a solution. And the solute can be added successively to produce a whole series of solutions which differ slightly in concentration. However, the process of adding solute cannot go on indefinitely. Eventually a stage is reached beyond which addition of solute to a specified

Present address: Dr. S.I. Pothan, Asstt. Director (NFE), office of deputy director of Education, Kawardhna-491 995 (M.P.) India.

amount of solvent does not produce another solution of higher concentration. Instead, the excess solute remains undissolved.²

Ionic bonds are considered to be linear because of their non-directional character.³

When ionic compound (solute) comes in contact with water (solvent), water behaves like a scissors-cutting the linear ionic bonds. Thus ionic compounds are cut down by nature's scissors *i.e.*, water, due to molecular vibration.

Conclusion

The water molecule behaves as a scissors because of its shape and molecular vibration. Ionic compounds are considered to be linear. Thus the scissors-like water cuts the linear ionic bonds and ionic compounds are dissolved in water.

REFERENCES

1. C.N.R. Chemistry, NCERT, New Delhi, p. 338 (1988).
2. Sienko, Plane Chemistry, McGraw, Hill, New Delhi, p. 245 (1984).
3. S.L. Jain Chemistry, M.P.R. Institute, Udaipur, p. 22 (1995).

(Received: 30 December 1997; Accepted: 17 February 1998) AJC-1466