

Abstract

Using near infrared spectroscopy for structural studies of water: simultaneous effects of ions, pressure and temperature

Vegard H. Segtnan

Nofima – The Norwegian Institute of Food, Fisheries and Aquaculture Research
Osloveien 1, N-1430 Ås, Norway
Corresponding author: vegard.segtnan@nofima.no

Introduction

The structure of water is a topic that has aroused interest in many different fields of science. However, the structure of liquid water is difficult to measure using conventional analytical tools. Since water structure is mainly a function of hydrogen bonding between water molecules, NIR spectroscopy has recently been suggested as a potential tool for such measurements.

Materials and Methods

In order to create dynamic changes in water structure, controlled perturbations have been performed. Different ions were added to pure water and these different samples were all measured at different pressures and temperatures inside a pressure chamber. The chamber allowed independent temperature and pressure control.

Results and Discussion

Results from curve resolution and dynamic analysis will be presented for the perturbed water spectra. The results will be interpreted in terms of hydrogen bond patterns and water structure, and the potential and limitations of the approach for other scientific problems will be discussed.

Conclusion

NIR spectroscopy has been found capable of measuring the effect of ions, pressure and temperature on the structure of water.