

SHIRAKASHI LAB.

[Phase change and dry / cooling technology]

Department of Mechanical and Biofunctional Systems

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Phase Change Thermal Engineering

Mechanical
Engineering
department

Desiccating Vitrification and Cooling Device

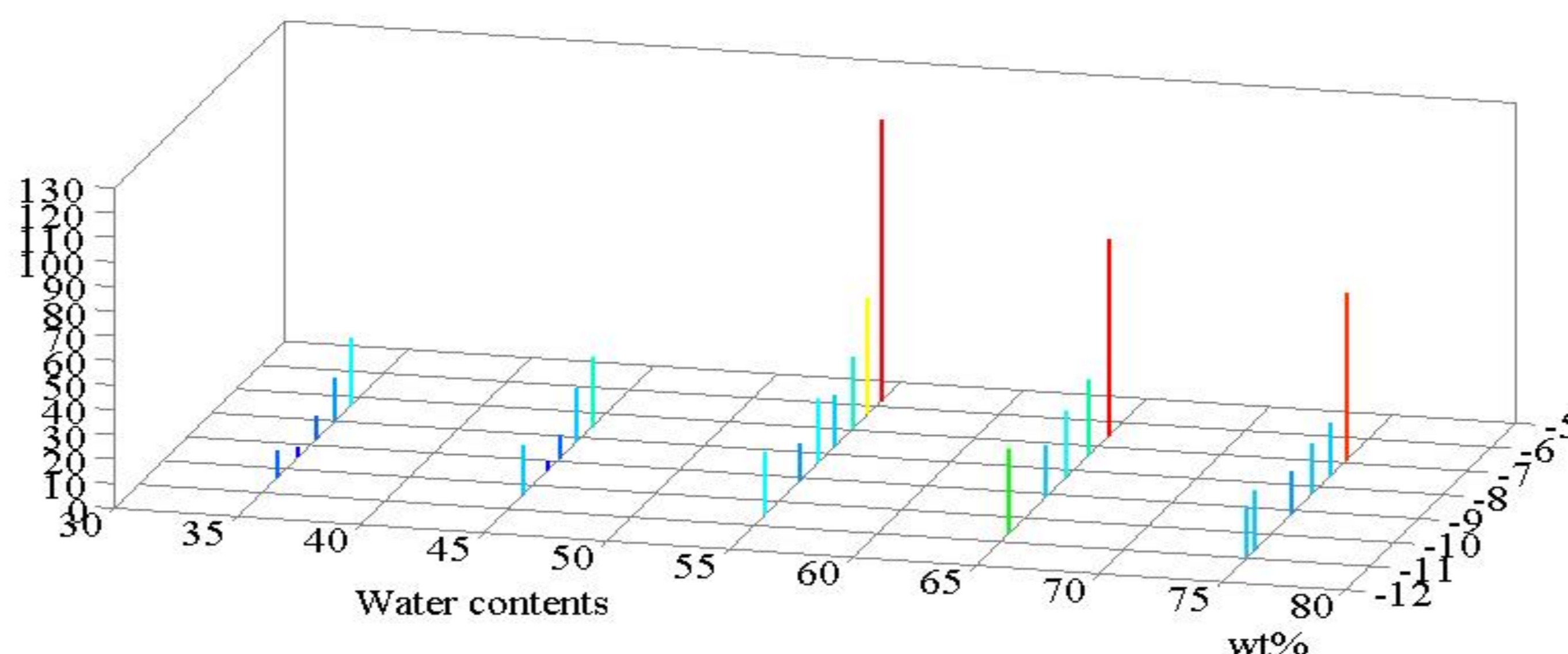
Controlling and predicting the properties of phase change

The vitrification technology of biomaterials at room temperature is free from temperature control during its operation and preservation. This feature allows an ideal low cost bio-preservation. We have developed the rapid drying vitrification of liquidus biomaterials that keeps the high quality of sample materials.

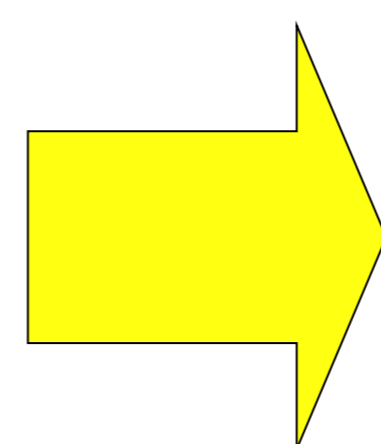
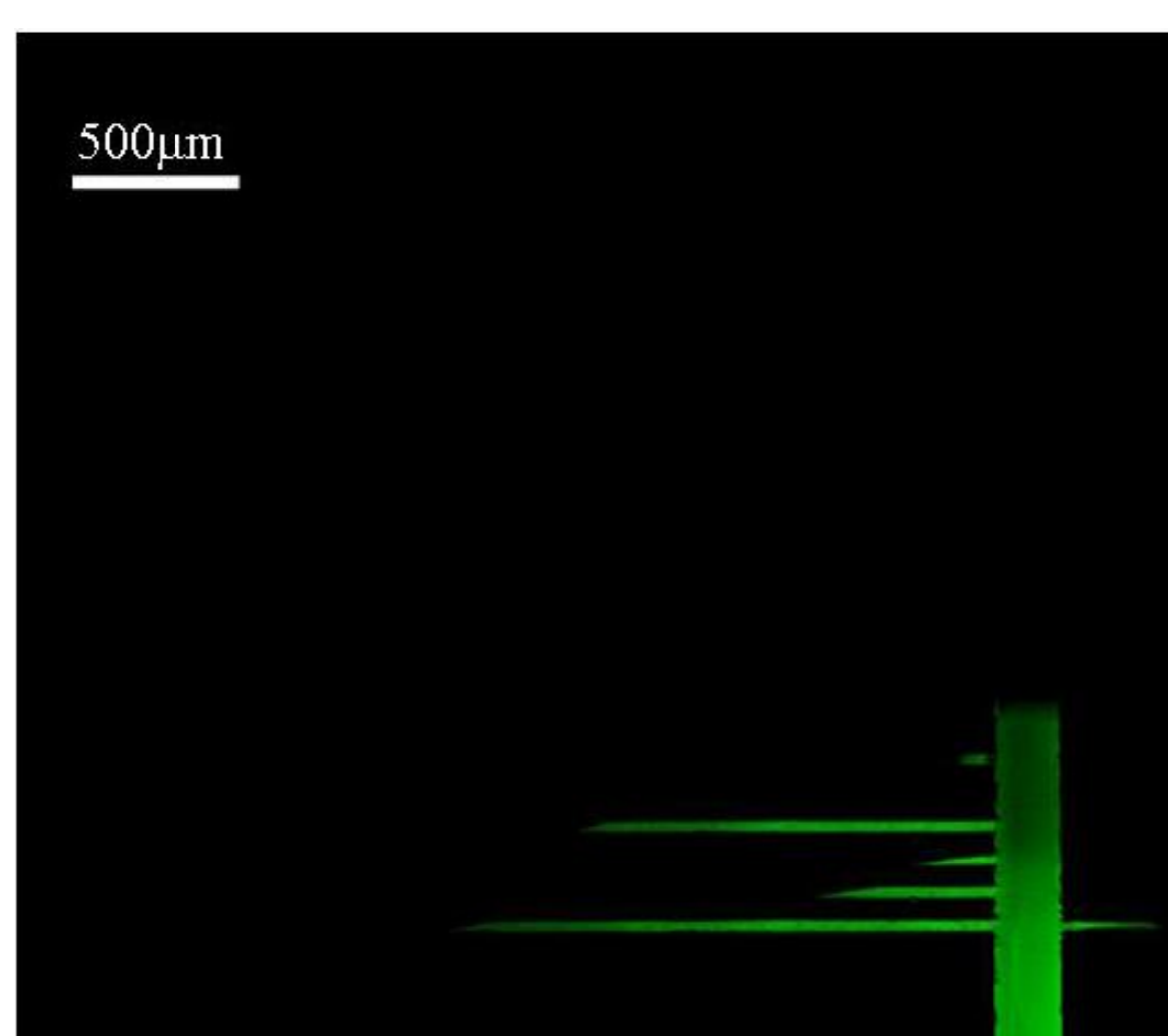
Making the high heat flux of gas-liquid-solid contact line region apparent enables a high performance cooling device. We have succeeded to predict heat transfer properties in a micro groove and of the patterned grooves.

We also have developed the technique for measuring the molecular relaxation and the quantity of free and bound water in various soft materials, such as biological tissues, soils, polymer solutions, pastes and foods. With this technique the freezing and evaporating properties of retained water are predicted.

- ◆ **Rapid drying vitrification: Preserving liquidus clinical samples**
- ◆ **Microgroove evaporator: Heat transfer characteristics in a single groove and of patterned grooves**
- ◆ **Broadband dielectric spectroscopy and Infra-red spectroscopy: Measuring the molecular dynamics and the amount of free / bound water in association with freezing and evaporation.**



Relaxation time distribution of food preservative



Liquid flow in the patterned Microgroove

